FISHERIES MANAGEMENT AND EVALUATION PLAN

Mid-Columbia River Region

Prepared by
Washington Department of Fish and Wildlife

7 March, 2003

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Date Completed.
7 March, 2003.

SECTION 1. FISHERIES MANAGEMENT

1.1) General objectives of the FMEP.

This plan describes the Washington Department of Fish and Wildlife (WDFW)-regulated recreational fisheries in tributary waters of the Columbia River located in the Mid-Columbia River (MCR) Washington State Salmon Recovery Region. The major tributaries involved in this plan are the Little White Salmon, White Salmon, Klickitat, Walla Walla, and Yakima rivers. The areas covered in this document are generally the watersheds used by steelhead in the Middle Columbia River Steelhead ESU for spawning, rearing, and migration and will be referred to as the Mid-Columbia Management Area (MCMA). This plan does not discuss or evaluate fisheries held in the Columbia River mainstem. Columbia River mainstem fisheries are described, analyzed, and impacts to listed fish are assessed in biological assessments (BAs) written by the Technical Advisory Committee (TAC). The TAC was established by the Columbia River Fish Management Plan (CRFMP) and develops the BAs for consultation with the National Marine Fishery Service (NMFS) via Section 7 of the Endangered Species Act (ESA). A biological opinion for these fisheries may then be issued by NMFS.

The objectives of the WDFW Fishery Management Evaluation Plan (FMEP) are based on the WDFW Wild Salmonid Policy (WDFW 1997). This policy states that harvest rates will be managed so that 1) spawners are abundant enough to utilize all available habitats, 2) numbers and distribution of locally adapted spawning populations will not decrease, 3) genetic diversity within populations is maintained or increased, 4) natural ecosystem processes are maintained or restored, and 5) sustainable surplus production, above levels needed to utilize all available habitats and provide for local adaptation, genetic diversity, and ecosystem processes, will be managed to support fishing opportunities (WDFW 1997). In addition, fisheries will be designed to ensure adult size, run timing, distribution of migrating and spawning populations, and age at

maturity remains the same between fished and unfished populations. By complying with this policy, fishery impacts to listed chinook and steelhead in the MCMA will be managed to promote the recovery of these species, and at rates that will not jeopardize their survival or recovery.

The boundary of the MCMA includes three WDFW administrative management regions (Regions 1, 3, and 5). Region 1 includes the Walla Walla River basin and is managed through the regional office in Spokane. Region 3 includes the Yakima River basin and is managed through the regional office in Yakima. Region 5 includes the Little White Salmon, White Salmon, and Klickitat river basins, and Rock Creek and are managed through the regional office in Vancouver. The WDFW manages these regions with basin-specific management objectives (Figure 1). Each watershed differs from the others in physiology and demographic structure, and is unique in fishery management objectives. Although the WDFW fishery management philosophy is the same statewide; mitigation goals, salmonid population status, and litigation responsibilities vary from one region to the next.

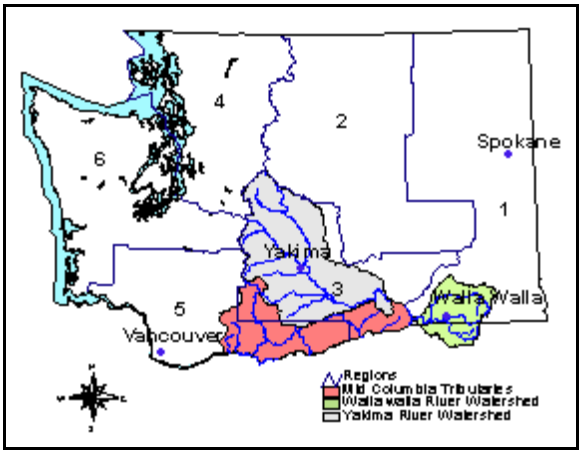

Figure 1. WDFW administrative management regions and MCMA watersheds.

Steelhead hatchery management in the Walla Walla River basin is obligated to provide 900 returning hatchery adult steelhead to the Walla Walla River and 750 returning to the Touchet River for harvest opportunity, per the Lower Snake River Compensation Plan (LSRCP). These numbers are mitigation measures authorized by Congress to compensate for the loss of fish that resulted from the construction and operation of four lower Snake River dams, and are fishery management objectives in this region.

Other WDFW fisheries management objectives are to provide means in which to harvest hatchery-origin fish. Hatchery-origin fish are released into the MCMA as part of mitigation programs under the auspice of the LSRCP, U.S. vs. Oregon, and the Mitchell Act. These fisheries management objectives are designed to:

- Minimize adverse genetic integration.
- Minimize straying of hatchery fish into natural spawning habitat.
- Create spacial and temporal separation between wild and hatchery-origin fish.

Finally, WDFW fisheries management objectives for resident fish species are to maintain recreational stream fisheries for trout and other species. Fishing regulations will be maintained for these species to minimize impacts on listed salmonids, and fish stocking programs will be conducted in a manner that will minimize potential competition and predation to listed salmonids.

1.1.1) List of the "Performance Indicators" for the management objectives.

Objectives discussed in this plan can be evaluated through monitoring fish populations and evaluating impacts to listed fish caused by the various fisheries in the MCMA. Since one of the objectives of this FMEP is to provide fishing opportunity consistent with the recovery of listed species at rates that do not jeopardize their survival or recovery, primary performance indicators for management objectives are abundance and productivity of wild salmon and steelhead stocks (stock assessments).

Primary performance indicators used to evaluate wild salmon and steelhead abundance and productivity (stock assessments) are:

A. Spawning ground and redd surveys.
B. Electrofishing surveys.
C. Snorkel surveys.
D. Dam and fish trap counts.
E. Hook-and-line sampling.
F. Genetic and morphometric sampling and population studies.

Secondary performance indicators used to monitor fisheries are:

A. Creel surveys.
B. Catch record card (CRC) analysis.
C. Coded-wire tag (CWT) analysis.

The WDFW also used stock assessment activities discussed above to assess bull trout, rainbow trout, cutthroat, and warmwater species stocks in the MCMA. Although WDFW fishing regulations require the release of bull trout in the MCMA, it is important to know the current status of their populations to manage this species. Bull trout stock assessments may occur annually in the Klickitat, Walla Walla, and Yakima River basins, and may impact listed salmon and steelhead in the MCMA.

The WDFW develops proposals that are presented to potential funding groups for salmon and steelhead monitoring and surveying activities for throughout the MCMA. These groups include Bonneville Power Administration, Yakima Klickitat Fisheries Project, and NMFS. The WDFW will continue to seek funding for projects to help estimate salmon and steelhead abundance in the MCMA.

The WDFW manages the Walla Walla River basin for mitigation objectives mandated in the LSRCP. Mitigation measures can provide both benefits and risks to the listed stocks in the basin. Performance indicators for mitigation measures that may benefit listed stocks are monitored using a CWT recovery program for hatchery steelhead, creel surveys, trap counts, snorkel and electrofishing surveys, and analysis of CRCs. Performance indicators for mitigation measures

that may present risk to listed stocks are monitored using creel surveys, hatchery fish stray evaluation, and enforcement of fishing regulations.

The WDFW's primary performance indicator for Yakima River recreational fisheries is to maintain a 2 percent or less incidental mortality rate of wild-origin steelhead. To evaluate the success of this indicator, WDFW will conduct creel censuses and angler interviews and collect and analyze CRCs. To assist with the performance evaluation, the WDFW will monitor the Yakima River steelhead population through dam counts at Prosser and Roza dams and redd surveys conducted in major spawning tributaries of the Yakima River.

1.1.2) Description of the relationship and consistency of harvest management with artificial propagation programs.

Hatcheries have operated in Washington for more than a century, providing fish for recreational and commercial fisheries. Hatcheries were originally built to compensate for declining wild fish populations. Later, they played a prominent role in enhancing the state's salmon and steelhead resources. Now, hatcheries are an important economic force statewide and are integral to North Pacific recreational, commercial, and tribal fisheries. Hatcheries also aid coast-wide management of chinook and coho by providing wild stock analogs for the CWT program. Salmon marked with CWTs are used to evaluate stock-specific fishery harvest rates and incidental impacts to ESA-listed salmon.

Currently, WDFW operates trout and salmon hatchery facilities to provide sustainable fisheries and meet the state's tribal treaty obligations by ensuring salmon and steelhead are available for harvest. Hatchery operations promote recovery and conserve wild salmonid populations through a variety of policies, such as juvenile release timing and locations, incorporation of endemic wild fish into broodstocks, and captive broodstock programs. Both functions–providing sustainable fisheries and conserving wild stocks–represent a major realignment in hatchery operations and are occurring at the same time WDFW, the tribes, the federal government, and independent scientists are developing a comprehensive operations strategy for all hatcheries in Washington.

I. REGION 1.
Hatchery production of steelhead in the Walla Walla River basin is mandated by mitigation measures established as a result of hydroelectric projects. The LSRCP was authorized by Congress in 1976 to offset losses in salmon and steelhead populations resulting from the construction and operation of the four lower Snake River dams. The LSRCP established goals for returning hatchery adult anadromous fish to the Snake River region for harvest purposes, and includes the Walla Walla River watershed within steelhead return goals. During the formation of the LSRCP, managers believed that smolt survival might not be as high as proposed, and for insurance, off-site mitigation was proposed. To provide for additional smolt production, and without exceeding the limits of the available habitat in Snake River tributaries, the management agencies at the time chose the Touchet and Walla Walla rivers as suitable mitigation sites, as they were geographically located near the Snake River. Federal funds paid for construction or

renovation of hatchery facilities, including WDFW hatchery facilities in the Walla Walla River basin, to produce fish to help meet the LSRCP's goals. Artificial propagation programs in the Walla Walla River basin are designed to return 750 adult hatchery steelhead to the Touchet River and 900 adult hatchery steelhead to the Walla Walla River per the LSRCP (USACE 1975). If these goals are not met, the program will adjust juvenile steelhead release levels in subsequent years.

The presence of hatchery steelhead in the Walla Walla River basin may adversely impact wild steelhead populations through genetic integration, competition for food and spawning habitat, and predation. To reduce these potential adverse impacts, WDFW fisheries management focuses on targeting hatchery-origin steelhead.

The LSRCP program has augmented depressed steelhead stocks in the Walla Walla River basin with Lyons Ferry Hatchery (LFH) steelhead stock. The LFH steelhead stock is considered to be outside the MCR steelhead ESU. Because the LFH steelhead are not part of the MCR steelhead ESU, NMFS in the most recent biological opinion considered the release of the LFH steelhead to constitute jeopardy for the listed steelhead populations within the Walla Walla River basin (NMFS 1999). The WDFW is developing a hatchery broodstock at the Touchet River hatchery using endemic Touchet River steelhead, in part as a result of the Reasonable and Prudent Alternatives discussed in NMFS' Biological Opinion (NMFS 1999). This endemic Touchet River broodstock program will phase out LFH steelhead releases as mitigation in the Touchet River (WDFW 2001a). Replacement of LFH stock, which is currently released into the Walla Walla River, will not be decided until it is determined if wild steelhead populations in the Touchet River, Walla Walla River, and Mill Creek comprise a single stock. Tissue samples from steelhead gathered throughout the Walla Walla River basin have been collected and are in the process of analysis.

A hatchery stock developed from the endemic Touchet River steelhead for mitigation may not increase overall natural productivity, but can serve several purposes.

- Maintain or increase numbers of naturally-reproducing Touchet River steelhead in underutilized spawning and rearing habitat.
- Minimize the potential for genetic introgression and depression that may occur with continued use of the existing LFH stock.
- Speed recovery of Touchet River steelhead once natural productivity has reached or exceeded replacement as a result of habitat improvements within the basin.
- Provide mitigation production under LSRCP while complying with NMFS's Reasonable and Prudent actions as listed in their Biological Opinion (NMFS 1999).
- Reduce the incidence of straying within the MCMA. Hatchery fish from the LFH program have been shown to stray into other river basins of the Columbia River. Although this program will consist of hatchery fish, straying may be reduced because the new hatchery stock will be developed from the endemic population. Mitigation goals will be fully integrated as conservation and recovery goals are achieved.

The LFH steelhead will continue to be released into the Walla Walla River as per the LSRCP. In an effort to address impact concerns to listed MCR steelhead, the number of LFH steelhead released into the Walla Walla River mainstem was reduced by 38 percent in 2001.

II. REGION 3.

The WDFW discontinued artificial propagation programs for steelhead in the Yakima River basin in 1994 in an effort to recover and protect the wild steelhead populations. Steelhead populations in the Yakima River are now predominately wild fish except for occasional hatchery strays entering the lower river. Harvest management in the basin is consistent with statewide regulations, which prohibit retention of wild steelhead. Due to the recovery efforts, lack of a hatchery steelhead program, and predominance of wild steelhead in the populations, WDFW does not authorize fisheries for steelhead in the Yakima River basin.

III. REGION 5.

Management of salmon and steelhead is intended to maximize harvest of hatchery-origin fish while preserving and promoting the recovery of listed fish. Hatchery salmon and steelhead are released into the Little White Salmon River (Drano Lake), White Salmon, and Klickitat rivers as part of mitigation for hydroelectric impacts and litigation as a result of U.S. vs. Oregon. Some of the hatchery fish released in these rivers originate from hatchery programs outside these river basins. There are no WDFW hatchery broodstock collection programs for listed salmon or steelhead within these watersheds. Therefore, no hatchery return goals are established.

IV. CONCLUSION.

The purpose of hatchery programs in the MCMA is to provide harvest opportunity. All hatchery steelhead released for augmentation are adipose fin-clipped. Presence of an adipose fin allows anglers to easily identify wild fish and limit handling. Marking programs for fall chinook are not fully developed at this time and some hatchery fall chinook may not be externally marked.

The WDFW manages fisheries in conjunction with hatchery programs. Fisheries for salmon and steelhead are concentrated near hatchery release areas where adult hatchery fish return during spawning migrations. The WDFW schedules fisheries to coincides with peak hatchery migration timings. Fishery management also creates sanctuary areas in natural spawning and rearing habitats by closing fisheries and using hatchery facilities, when possible, to limit hatchery fish access to these habitats.

The WDFW implemented several measures in the MCMA to minimize risk of adverse impacts to wild steelhead and salmon associated with agency-managed harvest and hatchery programs. Details regarding risk aversion/minimization measures imposed in hatchery steelhead and salmon production programs within the MCMA are included in WDFW's Hatchery and Genetic Management Plans (HGMPs). Documents such as HGMPs provide detailed descriptions of specific hatchery operation and objectives. The Walla Walla River basin and Touchet River HGMPs provide detailed information on hatchery operations and objectives (WDFW 2001a and b).

1.1.3) General description of the relationship between the FMEP objectives and Federal tribal trust obligations.

Federal court decisions (U.S. vs. Oregon 1969 and U.S. vs. Washington 1974) ruled that Indian tribes who signed treaties with the federal government in the 1850s have treaty fishing rights to harvest a share (50 percent) of surplus fish resources. These tribes may fish in their usual and accustomed fishing grounds in the Columbia River basin and other Washington waters. These court decisions mandated cooperative fisheries management in a government-to-government relationship between Washington State and the treaty Indian tribes. These decisions also mandate state hatchery facilities to produce fish to ensure harvest opportunities for treaty tribes.

Member tribes of the Columbia River Inter-Tribal Fish Commission may hold fisheries in Drano Lake and White Salmon, Klickitat, Walla Walla and Yakima river watersheds and the mainstem Columbia River. The WDFW does not regulate these fisheries. Each tribe retained its authority to regulate its fisheries and issues fishery regulations through its respective governing bodies. Tribal staff are represented on the CRFMP Technical Advisory Committee and participate in monitoring activities and data sharing with other parties. The tribes have policy representation in the U.S. vs. Oregon harvest management processes and generally coordinate fisheries with the Columbia River Compact (the Compact).

Beyond the federal tribal trust obligations, WDFW coordinates with local tribes in a variety of management projects. Local coordination occurs voluntarily with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) to manage steelhead production and harvest in the Walla Walla River basin as part of the Lyons Ferry operating plan. The WDFW also coordinates with the Confederated Tribes and Bands of the Yakama Indian Nation (YN) on fish management projects, such as the Yakima/Klickitat Fisheries Project and a steelhead kelt reconditioning project. Fishery management in the Yakima River basin is also cooperatively managed with the YN.

1.2) Fishery management area(s).

1.2.1) Description of the geographic boundaries of the management area of this FMEP.

This plan discusses and evaluates recreational fisheries in anadromous portions of the Little White Salmon (Drano Lake), White Salmon, Klickitat, Walla Walla, and Yakima river watersheds. It also includes Mid-Columbia River tributary streams in Klickitat and southern Benton counties from Rock Creek upstream to Switzler Creek that are accessible to Middle Columbia River Steelhead ESU (Figure 2).

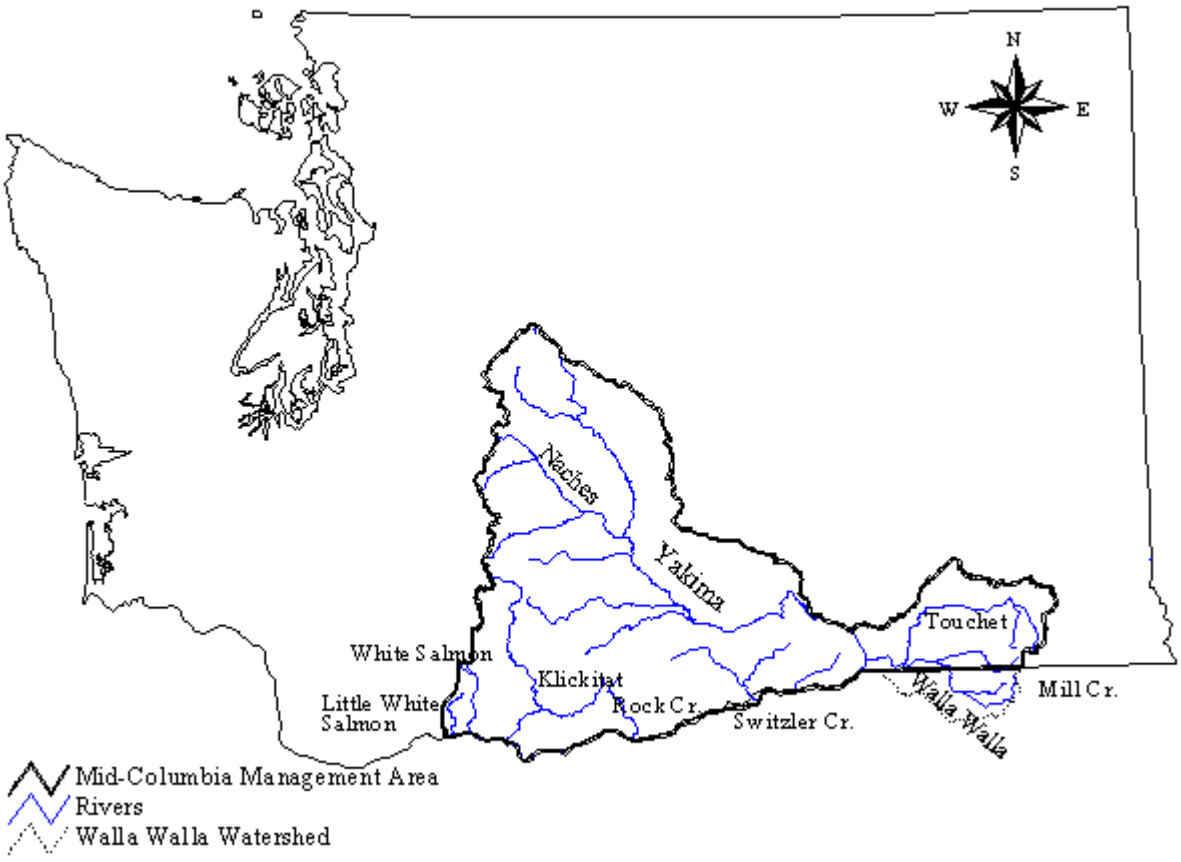

Figure 2. The Mid-Columbia Management Area (MCMA) encompasses all Washington tributary waters accessible to the Mid-Columbia steelhead.

1.2.2) Description of the time periods in which fisheries occur within the management area.

Fisheries in MCMA tributaries may occur year-round. Recreational fisheries target spring and fall chinook, summer and winter steelhead, coho, trout, whitefish, sturgeon, smelt, shad, warmwater fish, and other native and non-native species. Most harvest impacts to listed species occur during targeted fisheries, while fewer impacts occur during non-targeted fisheries. Salmon fisheries are closed year-round unless specifically opened by the Washington Fish and Wildlife Commission action or emergency rule. Trout, including steelhead, and other game fish fisheries in tributary waters are open June through October according the Statewide Rules, unless otherwise specified by WDFW. See Appendix A.

I. STEELHEAD

A fishery targeting winter steelhead occurs in the White Salmon River from mid-November to

mid-June. Effort in this fishery is concentrated from December through February when the majority of the run is entering the river. Winter steelhead may also be impacted by steelhead fisheries in the Klickitat River. However, these fisheries are open May through November only impacting the earliest part of the winter run which begins to enter the river in late November.

Summer-run steelhead, so called primarily due to entry timing into the Columbia River, are present in all major tributaries of the MCMA. Summer steelhead enter Drano Lake, White Salmon, and Klickitat rivers beginning in May. Target fisheries commence in April or May and continue through October or November. Steelhead fisheries in the White Salmon River continue through March. Summer steelhead begin to enter the Walla Walla River basin in October and November. Although steelhead may be retained during resident trout fisheries that begin in June, fishing effort for summer steelhead begins in September and continues through mid-April when steelhead are present in the river. The WDFW does not authorize a fishery targeting steelhead in the Yakima River basin, consistent with recovery and rebuilding programs for Yakima River steelhead.

II. SALMON

Recreational fisheries targeting spring chinook commence soon after fish enter tributaries in March. These fisheries typically close in June or July to protect spawners. Spring chinook fisheries are open some years in Drano Lake and in the White Salmon, Klickitat, and Yakima Rivers. Spring chinook peak migration into the Yakima River is a few weeks later than downriver tributaries. The timing of the spring chinook targeted-fishery reflects the later run-timing.

Fisheries targeting fall chinook and coho occur in the Drano Lake and the White Salmon, Klickitat, and Yakima river basins. These fisheries typically open in July and may continue through December, however, effort peaks in September for chinook and October for coho. From October through December, the WDFW closes fisheries targeting fall chinook in White Salmon River to protect spawning fish. Both tule and bright fall chinook stocks exist in the White Salmon and Klickitat rivers, and only brights are found in the Yakima River basin.

The WDFW does not open salmon-directed fisheries in the Walla Walla River basin. Salmon are believed to be extirpated from the basin. However, CTUIR initiated a reintroduction program for spring chinook in the Walla Walla River basin. The CTUIR released adult spring chinook collected at the Ringold Hatchery facility into the South Fork Walla Walla River and Mill Creek. These releases are a part of a spring chinook reintroduction program coordinated between Bonneville Power Administration (BPA) and CTUIR. The CTUIR release approximately 1,600 adult spring chinook annually; 25 percent to be released into the Mill Creek and the rest into the South Fork of the Walla Walla River. The number of spring chinook released will very depending on availability of fish. The WDFW may hold a fishery for spring chinook in the future, if the reintroduction program is successful. Details of a fishery and criteria for population levels have not been established. If the WDFW holds a fishery, the timing would be similar to the spring chinook fishery in the Yakima River. Coordination with CTUIR will continue

regarding spring chinook in the Walla Walla River basin.

III. OTHER FISH SPECIES
Fisheries in the MCMA target non-listed fish including trout, whitefish, and warmwater species. Fisheries for hatchery coho salmon destined for White Salmon, Klickitat and Yakima rivers occur from August through January in most years. The general fishing season for resident fish species is opening from June through October. However, many tributaries in the MCMA may remain open for trout through March to provide harvest opportunity for winter steelhead and other winter angling opportunities. These fisheries are closed in April and May to protect spawners and smolts.

A framework for recreational fishing rules in the MCMA is included in Appendix A.

IV. STOCK ASSESSMENTS
Timing of stock assessment activities varies. Activities such as hook-and-line and snorkel surveys may occur year-round, depending on data needs. Spawning surveys occur from February through June for steelhead and August through mid-December for chinook and coho. Electrofishing surveys are typically conducted June through September. Dam counts and fish traps are monitored during salmon and steelhead run timing. Spring chinook runs are monitored from March through June or July, while fall chinook and coho runs are monitored from August through December. Steelhead run timing typically occurs February through June in the MCMA. Juvenile salmonid trapping occurs during the outmigration, from March through July.

1.3) Listed salmon and steelhead affected within the Fishery Management Area specified in section 1.2.

Fisheries management activities may affect all listed steelhead populations in Washington tributaries of the Middle Columbia River Steelhead ESU, LCR tule fall chinook in the White Salmon River, and listed Columbia River basin bull trout. Under the Section 4(d) ruling, the USFWS found Washington angling regulations adequate to provide continued conservation benefits for bull trout under existing state regulations (63 FR 31647; 64 FR 58910).

I. REGION 1.
Listed MCR steelhead occur throughout the Walla Walla River basin. The WDFW Salmon and Steelhead Stock Inventory (SASSI) identifies two separate stocks in the basin, the Touchet River stock and the Walla Walla River stock (WDF and WDW 1993). The WDFW releases summer steelhead from the LFH into the Touchet and Walla Walla rivers annually. An endemic Touchet River hatchery stock is being developed to replace the LFH stock for the Touchet River. The LFH summer steelhead stock is not considered part of the Middle Columbia River Steelhead ESU (64 FR 14517).

II. REGION 3.

The Yakima River is the upper extent of the range of MCR steelhead. The SASSI identifies only one stock within the Yakima River basin, however, separate populations utilize Satus and Toppenish creeks, Naches River, the mainstem downstream of Roza Dam, and the mainstem upstream of Roza Dam. Steelhead from Wells and Skamania hatcheries were released into the Yakima River from the early 1960s to the late 1980s. Hatchery-reared native Yakima River steelhead were released into the river from 1987 to 1991 (WDF and WDW 1993). Hatchery releases from various research projects continued until 1994. The WDFW has not released hatchery steelhead in the Yakima River basin since 1994.

III. REGION 5.

Little White Salmon River

No natural populations of steelhead or tule fall chinook exist in the Little White Salmon River. Falls located at about river mile (RM) 2 block all upstream passage of anadromous fish. When Bonneville Dam was completed in 1938, the resulting reservoir inundated the available spawning habitat. In 1974, a diversion dam was constructed at the Little White Salmon National Fish Hatchery (NFH), located at RM 1.0, to divert salmon to the hatchery. This dam was constructed to prevent adult passage to facilitate and maximize adult collection at the hatchery. Should steelhead pass this diversion dam, the remaining available habitat is insufficient to support self-sustaining steelhead populations (NMFS 2000a). The WDFW has received occasional reports of naturally spawning steelhead upstream of the barrier dam, but the origin of the fish is not known. Hatchery steelhead are released into Drano Lake, which now supports a substantial fishery for salmon and steelhead.

The Little White Salmon River historically contained naturally spawning populations of chinook salmon. When the Bonneville pool inundated the spawning habitat, natural salmon production ceased (WDW et al. 1990a). The area directly below the barrier dam may support natural spawning when Bonneville Reservoir levels remain low, but rearing habitat is minimal. Limited natural spawning of tule fall chinook in this area is likely composed of hatchery strays from Spring Creek NFH (NMFS 2000a).

White Salmon River

Both summer and winter steelhead are found in the White Salmon River (WDF and WDW 1993). The Condit Dam blocks upstream migration at RM 3.3, eliminating more than 90 percent of the previously-accessible steelhead habitat. A sub-basin plan study suggests that available habitat in the lower 3.3 miles of the river (below the dam) will support a population of only 50 wild summer and 50 wild winter adult steelhead (WDW et al. 1990b).

Summer and winter hatchery steelhead are released into the White Salmon River as part of the U.S. vs. Oregon agreement. The hatchery steelhead come from the Skamania Hatchery, located on the Washougal River. The summer Skamania hatchery stock originated from wild fish collected from the Washougal and Klickitat rivers (WDFW 2000). The winter Skamania hatchery stock originated from wild fish from the Washougal River and the Beaver Creek

hatchery located on the Elochoman River. Skamania hatchery summer and winter steelhead are not considered part of the Middle Columbia River Steelhead ESU (64 FR 14517).

Two separate fall chinook stocks, tules and brights, exist in the White Salmon River. Tule fall chinook are native to the system and are Washington's upper-most extent of the Lower Columbia River Chinook ESU. Although native, the current stock origin (origin of natural spawners) for the natural spawning tule fall chinook is considered mixed (WDF and WDW 1993). Hatchery tule fall chinook were last released into the White Salmon River in the 1980s, but strays are commonly recovered in the river. Most are probably from the Spring Creek NFH.

The White Salmon River bright fall chinook salmon originated from the Columbia River above McNary Dam and are not listed or part of the LCR Chinook ESU. Hatcheries at Bonneville and on the Little White Salmon River produce bright fall chinook to mitigate for chinook salmon lost due to the construction and operation of mainstem Columbia River dams. Since 1988, the WDFW has observed stray brights from these facilities spawning in the White Salmon River. The WDFW considers the White Salmon River bright fall chinook a mixed-origin stock. The USFWS releases non-native hatchery spring chinook annually into the White Salmon River.

Klickitat River

Both summer and winter steelhead occur in the Klickitat River. The status of these stocks is not known. The river presents many problems when it comes to estimating abundance for steelhead, such as seasonal high flows, turbid water, and access limitations. These conditions require extra effort to gather data needed to estimate steelhead abundance in the Klickitat River. Annually, WDFW develops and presents proposals to potential funding groups for monitoring and surveying activities. The WDFW has submitted proposals to groups such as BPA, Yakima Klickitat Fisheries Project, and NMFS. The WDFW will continue to seek funding for projects in the Klickitat River that will help to estimate steelhead abundance.

The WDFW has received funding to install and operate a fish trap in the Number 5 fishway at Lyle Falls on the Klickitat River in 2003 and 2004. This project is the initial stage in building a database for steelhead and other salmonid run sizes in the Klickitat River. Eventually, this database will help WDFW make management decisions about the Klickitat River salmonid populations.

The YN conducts annual spawning ground surveys in index streams in the Klickitat River basin and operates two smolt traps to determine productivity. However, the spawning ground surveys cover less than 50 percent of the available spawning habitat in the basin and the efficiency of the smolt traps is not optimal (B. Sharp YN, pers. comm.). The YN is expanding the spawning ground surveys to cover more of the basin and relocating the smolt traps to more productive trapping locations. Data are not available to accurately estimate annual escapement or basin productivity.

Meanwhile, WDFW will use the average annual escapement of steelhead into the Hood River

from 1995 to 2000 to provisionally represent the status of Klickitat River steelhead populations. Hood River is the Bonneville pool tributary closest to the Klickitat River in watershed size and steelhead run composition. The Powerdale Dam, located at RM 4.5 of the Hood River, has an upstream adult trap associated with the passage facility that allows for total counts of all upstream migrating fish (Chilcote 2001). Based on data provided in Chilcote (2001), Hood River summer and winter steelhead populations are stable.

The WDFW is required under U.S. vs. Oregon treaty obligations to release steelhead into the Klickitat River. The WDFW releases 100,000 hatchery summer steelhead annually from the Skamania Hatchery into the Klickitat River. Skamania hatchery summer steelhead are not considered part of the Middle Columbia River Steelhead ESU (64 FR 14517).

Rock Creek

The SASSI identifies a stock of summer steelhead in Rock Creek (WDF and WDW 1993). The lower sections of Rock Creek dry up annually in summer and early fall due to the lack of precipitation and water withdrawals. Wild adult steelhead from this stock must wait in the mainstem of the Columbia River for fall/winter rains to replenish the creek's flow before they can enter and migrate upstream to spawn. Juvenile steelhead typically outmigrate prior to the annual drying of the creek bed. No hatchery steelhead are released into Rock Creek or its tributaries. Historic data suggest no hatchery steelhead have ever been released into the Rock Creek drainage in the past.

1.3.1) Description of "critical" and "viable" thresholds for each population (or management unit) consistent with the concepts in the technical document "Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units."

McElhany et al. (2000) defines population performance in terms of abundance, productivity, spatial structure, and diversity. The fisheries discussed in this FMEP may affect abundance and productivity, while spatial structure and diversity are probably not influenced. Spatial structure is generally a function of habitat size and distribution. Fisheries discussed in this FMEP do not affect habitat. This FMEP focuses primarily on maintaining harvest rates that are consistent with recovery of listed salmonids. The low fishery impact rates also will not reduce population size to levels where spatial effects are exacerbated. Diversity concerns for listed mid-Columbia River stocks are primarily related to the effects of natural spawning by hatchery fish and the resulting effects to the biological characteristics of each stock. Low fishery impact rates on wild fish will not exert enough selection pressure on any single characteristic to affect diversity.

Critical and viable thresholds can be developed based on abundance data, habitat capacities, or genetic necessities. Definitions of appropriate thresholds depend largely on the capacity and productivity of available habitat and corresponding population size at which compensatory population processes begin to provide resilience. Without high quality long-term data on population abundance and productivity, it is difficult to determine how large a population must

be to be resilient against any compensatory process. The WDFW lacks this type of information in all tributaries within this management plan, and lacks data needed to evaluate habitat productivity and capacity in the tributaries which sustain regulated fisheries. Preliminary estimates of productivity and capacity will require several years of age-specific escapement data in addition to the data already collected. However, a viable population size can be estimated using genetics.

The Viable Salmonid Population (VSP) document provides limited guidance on fish numbers corresponding to critical and viable thresholds. The authors discuss hypothetical risks related to genetic processes effective at annual spawning population ranging from 50 to several thousand individuals (McElhany et al. 2000). The VSP guidelines include multiple cautions about the effects of uncertainty in population assessments and also recommend an adaptive management approach to reduce uncertainty (McElhany et al. 2000).

I. CRITICAL THRESHOLD

Many genetic studies have been conducted to estimate the population size needed to maintain genetic health (Franklin 1980; Thomas 1990; Newman and Pilson 1997; Latter 1998). Population sizes ranging from ten breeders to several thousand have been estimated for genetic viability. Many of the genetic studies involve organisms other than salmonids. Popular test subjects include single age-class breeders such as evening primrose *Clarkia pulchella* (Newman and Pilson 1997) and fruit flies *Drosophila melanogaster* (Latter 1998).

Conservation literature makes several recommendations for minimum population sizes needed to avoid deleterious genetic effects. The “50/500" rule of thumb initially advanced by Franklin (1980) and Soule (1980) prescribes a short-term effective population size of 50 to prevent an unacceptable rate of inbreeding, and a long-term population size of 500 to maintain overall genetic variability (Thompson 1991). However, this rule of thumb is based on single age-class breeders, *Drosophila*, whereas salmonids are multi age-class breeders.

Waples (1990) investigated genetics of Pacific salmon. His investigations took into account a single breeding population of salmon and steelhead may contain individuals from several different generations. Fish ranging in age from less than one year to six or seven years can comprise a single brood year. He used genetic modeling to suggest that 100 effective breeders per year are necessary to maintain genetic variation in salmon populations for 25 generations (roughly 75 to 125 years). This number of effective breeders assumes the average age of the breeders is four years. This closely resembles the average age structure of chinook and steelhead within the MCMA. To maintain genetic diversity of listed salmon and steelhead in the MCMA, an interim critical abundance threshold of 100 wild spawners per year is used by WDFW for fisheries management purposes.

II. VIABLE THRESHOLD

The ESA stipulates that delisting criteria (recovery) must be determined for each listed ESU. To determine recovery criteria, NMFS appointed Technical Recovery Teams (TRTs). The TRTs

will use the concept of VSP to help develop recovery goals for salmon and steelhead stocks and corresponding threshold sizes within the ESUs (McElhany et al. 2000; NMFS 2000b).

Under the fisheries management regime presented in this FMEP, viable thresholds will have no management implications for steelhead fisheries. No fisheries are directed on listed steelhead stocks; harvest of listed steelhead is strictly indirect. Therefore, fisheries are managed independent of steelhead stock status, providing status is above the critical threshold.

The WDFW has not developed a viable threshold for the White Salmon River tule fall chinook. Management of tule fall chinook fisheries in the White Salmon River does not depend on a viable threshold because:

- Available spawning habitat cannot support a natural population.
- Most of the natural spawning escapement are fish from the Spring Creek Hatchery.
- Current fisheries regulations protect spawning fall chinook.

Natural spawning habitat in the White Salmon River will not support a viable threshold abundance of tule fall chinook, mainly because the Condit Dam blocks all upstream fish passage at RM 3.3, eliminating 90 percent of the once available habitat. The available spawning habitat is further reduced by the inundation of the lower one-half mile of the river by the Bonneville pool. The remaining spawning habitat is insufficient to support a viable natural tule fall chinook population (B. Sanford, WDFW, pers. comm.).

Although hatchery fall chinook were last released into the White Salmon River in the 1980s, stray hatchery tule fall chinook make up an estimated annual average of 32 percent of the spawning escapement. The contribution of hatchery tule fall chinook has been estimated as high as 86 percent of the spawning escapement in 1999 (K. Harlan, WDFW, pers. comm.). Spring Creek Hatchery tule fall chinook contribute most of the hatchery strays (K. Harlan, WDFW, pers. comm.). The escapement of tule fall chinook in the White Salmon River depends on the success of the fall chinook program at Spring Creek Hatchery rather than natural production (J. Hymer, WDFW, pers. comm.).

The current WDFW regulations for recreational salmon fisheries in the White Salmon River prohibit the retention of fall chinook from October through December. This prohibition occurs during the peak spawning in the White Salmon River. Tule fall chinook are further protected by angler preference for the bright fall chinook; by the time tule fall chinook reach tributary streams of the Columbia River, they have begun to darken. Anglers are likely to return darker tule fall chinook to the river in hopes of catching the preferred bright fall chinook.

III. NMFS INTERIM ABUNDANCE TARGETS FOR RECOVERY

The NMFS has developed interim abundance targets for ESA-listed salmon and steelhead in the Interior Columbia Basin (NMFS 2002a). These targets are intended to represent the number of naturally-produced spawners that may be needed for recovery (Table 1). They are defined for geographic spawning aggregations within the ESUs and are to be reached annually for an eight-

year period, representing two generations of production. Using viability criteria developed through the Interior Columbia TRT, NMFS will replace these targets with more scientifically rigorous and comprehensive recovery goals.

Table 1. Interim abundance targets developed by NMFS for salmon and steelhead stocks in the MCMA (NMFS 2002a).

Stock	Interim Abundance Targets	Comments
White Salmon tule fall chinook	N/A	No interim target has been established for this stock.
White Salmon winter steelhead	N/A	No interim target has been established for this stock.
White Salmon summer steelhead	N/A	No interim target has been established for this stock.
Klickitat winter steelhead Klickitat summer steelhead	3,600	Includes all steelhead, winter and summer stocks.
Rock Creek summer steelhead	N/A	No interim target has been established for this stock.
Walla Walla summer steelhead Touchet summer steelhead	2,600	Total for the entire Walla Walla River basin.
Yakima summer steelhead	10,500 Total:	Total of four separate populations.
Satus/Toppenish	2,400	
Naches	3,400	
Mainstem (Wapato to Roza)	1,800	
Mainstem (above Roza)	2,900	

The SASSI (WDF and WDW 1993) defines an individual stock as fish spawning in a particular lake or stream(s) during a particular season, which to a substantial degree do not interbreed with any group spawning in a different place, or in the same place during a different season (WDF and WDW 1993). Although this definition may be reliable, some SASSI stocks are inherently too small to be genetically viable due to habitat availability or capacity, or they may be subpopulations of a larger population. To address the critical population issue, some SASSI stocks may need to be classified into subpopulations of a larger population based on geographic location and spawn timing of each subpopulation. Table 2 illustrates the SASSI stocks present in the MCMA.

Table 2. List of the natural populations of listed salmon and steelhead in the MCMA, interim abundance targets, and associated hatchery stocks (WDF and WDW 1993; NMFS 2000a; D. Rawding, G. Mendel, J. Easterbrooks, WDFW, pers. comm.).

SASSI populations of listed salmon and steelhead stocks	Associated hatchery stock(s)[1]	Escapement/ Mgmt. Goal[2] (LSRCP)	Most recent 5-year average escapement estimates	WDFW SASSI status	Interim abundance tagets[3]	Interim Critical Pop.	Harvest rate
White Salmon tule fall chinook	None Strays from Spring Ck. NFH.	N/A	588	Depressed	N/A	> 100	≤ 49% - Ocean/Columbia mainstem fisheries
White Salmon winter steelhead	Skamania winters	N/A	N/A	Depressed	N/A	> 100	≤ 5%
White Salmon summer steelhead	Skamania summers	N/A	N/A	Depressed	N/A		
Klickitat winter steelhead	None	2,965	260[4]	Unknown	3,600	> 100	≤ 5%
Klickitat summer steelhead	Skamania summers			Unknown			
Rock Creek summer steelhead	None	N/A	N/A	Unknown	N/A	> 100	< 4%
Walla Walla summer steelhead	Lyons Ferry summers	1,600[5] (900)	N/A	Depressed	2,600	> 100	≤ 5%
Touchet summer steelhead	Touchet endemic summers	600 (750)	304	Depressed			
Yakima summer steelhead	None	3,000	2,149	Depressed	10,500	> 100	< 2%

[1] Except for the Touchet endemic stock, none of the hatchery stocks released into the MCMA are considered part of the MCR steelhead ESU.

[2] Escapement goals for steelhead stocks set during moderate to high ocean productivity are outdated and at this time, insufficient data have been gathered to accurately update escapement goals.

[3] NMFS has developed interim abundance targets for listed salmon and steelhead in the Interior Columbia Basin (NMFS 2002a). The TRTs will develop permanent critical and viable populations that will be incorporated into the FMEP when analyses are completed and provided to WDFW.

[4] This number is based on redd surveys conducted by the YN from 1996 to 2000 in tributaries. This number represents escapement in those tributaries surveyed and not the basin as a whole. No indication was given whether these were summer or winter run fish.

[5] Biologists from Oregon and Washington estimated this to be the spawning capacity of steelhead in the Walla Walla River, includes all Walla Walla tributaries, and the Touchet River. This is not a management goal.

1.3.2) Description of the current status of each population (or management unit) relative to its "Viable Salmonid Population (VSP) thresholds" described above. Include abundance and/or escapement estimates for as many years as possible.

The MCMA contains two populations of listed winter steelhead, six populations of listed summer steelhead, and one listed fall chinook population. These populations represent portions of the Mid-Columbia steelhead and Lower Columbia chinook ESUs.

I. STEELHEAD

Little White Salmon River

The WDFW does not recognize a steelhead stock in the Little White Salmon River. The habitat in this river is insufficient to support a self-sustaining steelhead population (NMFS 2000a). Hatchery steelhead are released into this system and may be contributing to unsubstantiated reports of naturally-spawning steelhead upstream of the barrier dam.

White Salmon River

The WDW et al. (1990b) estimated the available habitat in the White Salmon River may only support naturally-spawning summer and winter populations of 50 adults for each stock. This is based on smolt carrying capacity and a 3.0 percent smolt-to-adult return rate. The available spawning and rearing habitat for steelhead in the White Salmon River is limited to the lower 3.3 miles below Condit Dam. Habitat quality in this stretch of river is poor, with angular rock substrate, accumulations of silt, and little available habitat. These stocks may be part of larger winter and summer populations utilizing the White Salmon River and other nearby tributaries. Non-endemic Skamania stock summer and winter steelhead have been released into the basin since 1982, and are undoubtedly contributing to natural production.

Klickitat River

The current status of summer and winter run steelhead in the Klickitat River is not known. These runs are believed to be native to the system. Lack of funding and the inherent difficulty conducting population surveys in this river contribute to the current lack of knowledge.

The YN has conducted population surveys in the Klickitat River to gather information on steelhead; they've conducted spawning ground surveys in a limited number of tributaries in the basin and operated a couple of downstream smolt traps. The YN estimated an annual escapement of 260 steelhead per year based on spawning ground survey data collected from 1996 to 2000 (NMFS 2000a). These spawning ground surveys cover less than 50 percent of the available spawning habitat for steelhead in the Klickitat River basin (B. Sharp, YN, pers. comm.). Results from the smolt traps are insufficient to make any productivity conclusions. The trap placements in the river were not effective for catching fish. The YN is currently relocating the smolt traps to more efficient trapping locations.

Individual escapement estimates for summer and winter runs have not been made at this time. The WDFW has tried to obtain funding for monitoring and surveying for salmon and steelhead in

the Klickitat River. The WDFW has submitted proposals to groups such as BPA, Yakima Klickitat Fisheries Project, and NMFS. The WDFW will continue to seek funding for projects that will help to estimate salmon and steelhead abundance.

The WDFW received funding to install and operate a fish trap on the number 5 fishway at Lyle Falls, located at RM 2.2 on the Klickitat River. The fish trap will be installed in the spring of 2003 and operated for two fiscal year ending in 2005. This trap will provide WDFW with much needed data on escapement of salmon and steelhead into the Klickitat River. These data will provide the beginning of a database WDFW will use for fisheries management.

Meanwhile, the WDFW will use the current status of Hood River steelhead populations as a surrogate for the Klickitat River steelhead stock status. As shown in Chilcote (2001), steelhead populations in the Hood River are stable with increases evident in 2000. An average annual escapement of 600 steelhead, 431 winter and 169 summer run entered the basin from 1995 to 2000. The population of Hood River steelhead is well above the critical threshold used for fisheries management by WDFW.

Rock Creek

The SASSI identifies a stock of summer steelhead in Rock Creek. The lower sections of Rock Creek dry up annually in summer and early fall due to the lack of precipitation and water withdrawals. Wild adults from this stock must wait in the mainstem of the Columbia River for fall/winter rains to replenish the creek's flow before they can enter and migrate upstream to spawn. Juvenile steelhead typically outmigrate prior to the annual drying of the creek bed. The WDFW does not release hatchery steelhead into Rock Creek or its tributaries. Historic data suggest no hatchery steelhead have been released into the Rock Creek drainage in the past.

Walla Walla River

Based on habitat and carrying capacity of the Walla Walla River system, biologists from Oregon and Washington estimate the Walla Walla River basin could support a spawning population of 1,600 wild steelhead annually. This number includes all Walla Walla River tributaries and the Touchet River basin, but is not a management objective. This number also does not represent a recovery objective.

A fish passage facility at Nursery Bridge Dam has enabled ODFW and CTUIR to count steelhead returning to the upper Walla Walla River basin, and estimate spawning escapement (Table 3). The fish passage facility was upgraded in 2001, providing better passage for fish over the dam, however, the trapping facility is not functioning. Current estimates of escapement from dam counts cannot account for fish fall-back or fish that jump the dam, avoiding the passageway.

Table 3. Steelhead counts and escapement estimates for the Oregon portion of the Walla Walla River, upstream of Nursery Bridge Trap (G. Mendel, WDFW).

Run Year	Steelhead Counts			Percent	Estimated escapement		
	Wild	Hatchery	Total	Hatchery	Wild	Hatchery	Total
1992-93	722	17	739	2.3	815	2	817
1993-94	423	2	425	0.5	535	1	536
1994-95	340	19	359	5.3	430	5	435
1995-96	257	15	273	5.5	358	7	365
1996-97	231	18	249	7.2	292	5	297
1997-98	302	12	314	3.8	378	3	381
1998-99	224	5	229	2.2	279	1	280
1999-00	410	12	422	2.8	514	13	527
2000-01	600		600		700		700

The WDFW estimates Touchet River steelhead abundance using index stream spawning ground surveys and a makeshift fish trap, used to count fish, that was added to the water diversion dam on the Touchet River. When used in conjunction with index stream spawning ground surveys, trap counts provide WDFW a rough estimate the number of hatchery and wild spawning steelhead in the Touchet River basin (Table 4). Although survey and count data are expanded, uncounted spawning populations occur in the Touchet River basin. Annually more index streams and index stream segments are added and expanded to update and ameliorate escapement estimates. Because only index streams are surveyed, WDFW cannot accurately estimate the total escapement of steelhead into the Touchet River basin.

Table 4. Steelhead spawner escapement estimates above the Touchet River acclimation pond diversion dam. (G. Mendel, WDFW).

Year	Wild	Hatchery	Total	% Hatchery
1987	334	29	363	8.0%
1988	1006	88	1094	8.0%
1989	214	19	233	8.2%
1990	332	29	361	8.0%
1991	193	17	210	8.1%
1992	374	32	406	7.9%
1993	484	36	520	6.9%
1994	358	19	377	5.0%
1995	388	96	484	19.8%
1996	No information.			
1997	No information.			
1998	474	53	527	10.1%
1999	271	46	317	14.5%
2000	217	56	273	20.5%
2001	253	56	309	18.1%

To collect biological data to help assess the status of wild steelhead returning to the Walla Walla River watershed, a fish trap on Yellowhawk Creek is installed and operated each year from February 1 through May 31. The tri-state Steelheaders, a local fishing organization, monitors the trap continuously when in operation. This fish trapping program provides valuable information for use in stock management and recovery planning for steelhead populations in the basin. (Table 5).

Table 5. Steelhead counts at the Yellowhawk Creek trap (G. Mendel, WDFW).

Year	Wild	Hatchery	Total	% Hatchery
1990	9	4	13	31%
1991	9	4	10	40%
1992	48	0	48	0%
1993	33	2	35	6%
1994	11	0	11	0%
1995	8	2	10	20%
1996	40	2	42	5%
1997	8	2	10	20%
1998	4	6	10	60%
1999	1	0	1	0%
2000	13	0	13	0%
2001	12	3	15	20%

Escapement estimates for both the Touchet and Walla Walla rivers show stable steelhead populations over the past 10 years. The abundance of steelhead in both rivers is considerably higher than their critical threshold (Tables 1, 2, and 3). These data also show that wild steelhead populations are stable, and dominate the run. Hatchery-origin steelhead comprise about or less than 20 percent of either run over the past 10 years. The NMFS set the interim abundance target for the Walla Walla River basin steelhead at 2,600 spawners annually. No attempt has been made to estimate the total steelhead escapement into the Walla Walla River basin.

To improve the understanding of steelhead populations in the Walla Walla River basin, several projects are underway. In 2001 WDFW initiated spawning ground surveys in Mill Creek to estimate steelhead escapement. These surveys were not completed due to poor water clarity and high flows, however 22 redds were counted. Surveys are planned for the future. The WDFW plans to install a trapping facility in Mill Creek that would enumerate upstream migrating steelhead migrating. Spawning surveys are planned for other Touchet River tributaries, in addition to the index streams, to determine distribution and more accurately estimate escapement. The WDFW will continue to collect tissue samples from adult and juvenile steelhead for DNA analysis. The fish counting facility at the Touchet River acclimation dam has been proposed for update. Completion of these projects will rely on available funding.

Yakima River

Historic summer steelhead runs in the Yakima River system may have been as large as 100,000 spawners per year (YN et al. 1990). Habitat degradation and blockage by Columbia River

hydroelectric and Yakima River basin irrigation dams have greatly reduced the run size of Yakima River summer steelhead. Diverting water for irrigation reduces upstream passage capability for adults and reduces the carrying capacity for juvenile fish. Migrating adults also find their way into irrigation systems and become stranded.

Hatchery-reared steelhead were released into the Yakima River system for several decades. From the 1960s through the 1980s, hatchery-reared steelhead from outside the Yakima River system were released, and hatchery steelhead raised from native Yakima River steelhead broodstock were released from the late 1980s to the early 1990s. Hatchery steelhead programs ended in 1994 in an effort to limit genetic integration of hatchery stocks from outside the basin, and to promote the recovery of native Yakima River steelhead.

Fish passage above Roza dam prevented rebuilding of Yakima River steelhead in the upper mainstem until 1987. Until 1987, fish could access the fish passage facilities only at high pool levels. Maintenance of the pool level behind Roza Dam was not consistent with the run timing of native steelhead. A second fish passage facility was installed in 1987, allowing fish access to passage facilities at most water levels. For three to four generations, Yakima River steelhead have had unlimited access to habitats above Roza Dam. The number of steelhead is expected to gradually increase as more fish find their way to available habitats upstream of Roza Dam.

Yakima River steelhead escapements have increased within the past five years (Figure 3). Although abundance has been below historic levels, it has remained above the critical threshold. The recent upward trend in abundance indicates a stabilizing population, but is below the interim abundance target of 10,500 spawners per year that NMFS established for the Yakima River basin.

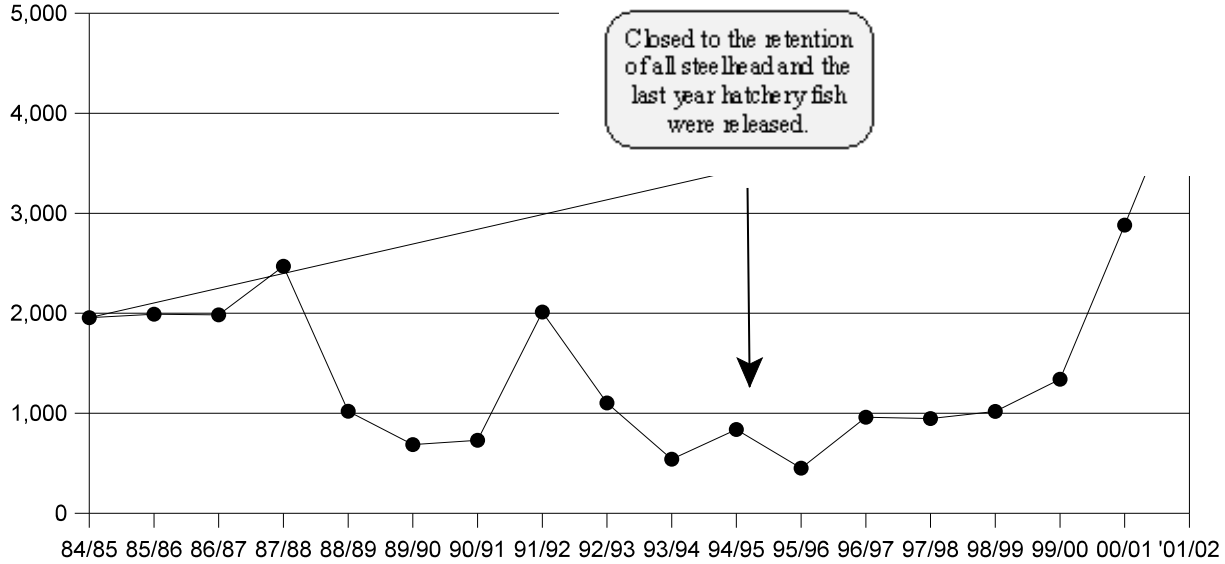

Figure 3. Yakima River wild steelhead escapement estimates based on Prosser Dam counts (J Easterbrooks. WDFW).

II. SALMON

Little White Salmon River

The WDFW does not recognize a natural tule fall chinook population in the Little White Salmon River. A natural population existed until 1938, when natural production ended due to the inundation of the Little White Salmon River from Bonneville Dam. Hatcheries in the Little White Salmon River produced and released tule fall chinook from 1896 to 1984. In 1984, these hatcheries switched production to bright fall chinook, which contribute more to the commercial and recreational harvest than the tule stock (WDW et al. 1990a).

A hatchery barrier dam was constructed across the Little White Salmon River in 1974 to facilitate and maximize adult collection at the adjacent Little White Salmon NFH. Although this barrier dam was designed to prevent adult passage, naturally-spawning fall chinook were observed during recent spawning surveys between the barrier dam and the falls. In 2000, 121 tule and 896 bright fall chinook were observed during spawning ground surveys conducted above of barrier dam (K. Harlan, WDFW, pers. comm.).

White Salmon River

Current habitat availability and conditions in the White Salmon River watershed is insufficient to support a self-sustaining tule fall chinook population. When built in 1912 the Condit Dam reduced available habitats to anadromous salmonids by more than 90 percent. The dam continues to degrade spawning and rearing habitats by preventing the recruitment of spawning gravel into the river downstream of the dam, and allowing the accumulation of fine sediments in the lower river reaches, choking spawning beds. Along with habitat degradation, native stocks of White Salmon River fall chinook and summer and winter steelhead are impacted by the introduction of hatchery fish. Stock origin of White Salmon tule fall chinook is mixed.

The WDFW has monitored the White Salmon River tule fall chinook stock since 1964, and has noted a long-term decline in abundance. The average spawning escapement between 1964 and 1982 averaged 1,290 fish per year (Figure 4). Since 1982, the average spawning escapement estimate has dropped to approximately 210 fish per year (Figure 4). The WDFW updated the survey technique used to estimate escapement in 1980. This may account for some of the differences in estimates. Although recent spawning escapement has been considerably lower than the annual historic levels, it has been stable and more than double the critical threshold. In 2001 WDFW estimated the escapement at 2,007 fish, the fourth largest since 1965. Spring Creek Hatchery steelhead made up 82 percent of this escapement.

At this time, NMFS has not developed interim abundance targets for listed salmon and steelhead in the lower Columbia River basin at this time.

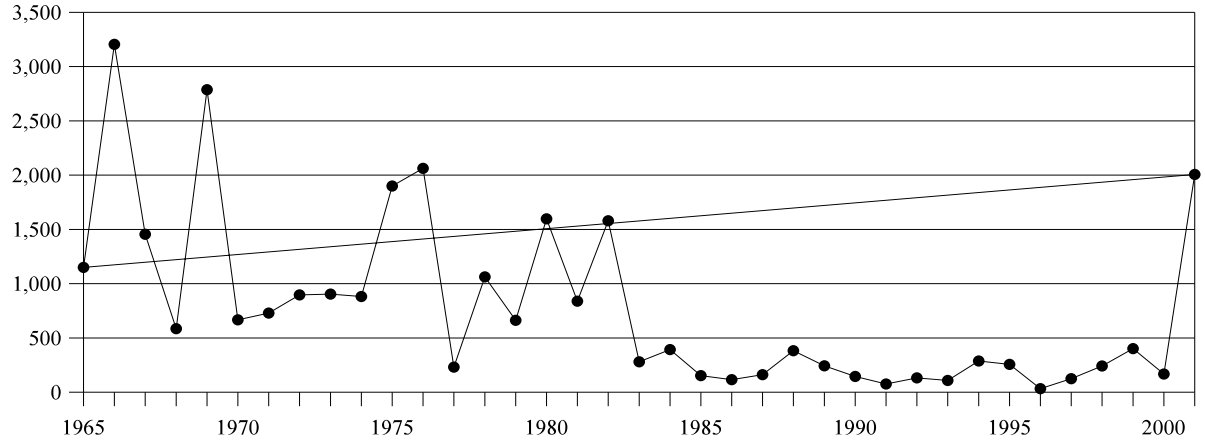

Figure 4. Tule fall chinook escapement estimates for the White Salmon River (K. Harlan, WDFW).

1.4) Harvest Regime

Harvest management and monitoring by WDFW includes collecting data from stream and harvest surveys; computer modeling; coordinating with tribal co-managers, other governments, and public input; and meeting mitigation and litigation objectives. Implementing these processes provides WDFW with the ability to craft fishing seasons that protect weak wild fish populations while providing harvest opportunities on plentiful hatchery and wild stocks.

Harvest of listed salmon in the MCMA is both direct and indirect, and harvest of listed steelhead is entirely indirect. Direct harvest occurs when listed fish are caught and retained as part of a legal daily limit. At this time, direct harvest of listed fish in the MCMA is allowed only for the White Salmon River tule fall chinook stock. Indirect harvest occurs when listed fish are incidentally caught and released during recreational fisheries. All WDFW-regulated recreational steelhead fisheries in the MCMA and Yakima River spring chinook fisheries are selectively targeting hatchery-origin fish, thus causing only incidental impacts to listed fish. Indirect harvest may also occur during recreational fisheries directed at other species such as resident trout and warmwater fish.

I. STEELHEAD

Hatchery production programs for steelhead throughout the MCMA result from mitigation or litigation (U.S. vs. Oregon) and include external marking of the hatchery fish. The WDFW releases externally-marked, hatchery-produced steelhead into the White Salmon, Klickitat, Touchet, and Walla Walla rivers. These marked hatchery fish enable WDFW to authorize fisheries for steelhead that do not directly impact wild steelhead stocks.

The WDFW will permit selective steelhead fisheries directed at hatchery-origin fish in river

systems containing hatchery steelhead as long as wild steelhead stock abundances maintain a rolling three-year average at or higher than the critical threshold level and hatchery broodstock goals are achieved. If wild stock abundance drops to or below the critical threshold, WDFW will consult with NMFS on the best management strategy to return the critical population above the critical threshold.

The WDFW will also consider hatchery broodstock collections goals when considering steelhead-directed fisheries. The hatchery steelhead program for Touchet River steelhead has a broodstock collection goal of 88 fish per year. This goal includes both endemic hatchery and natural-origin fish. The proportion of each has not been decided (WDFW 2001a). Management of steelhead fisheries in the Touchet River will focus on maintaining natural spawner abundance above the critical threshold and achieving the hatchery broodstock goal of 88 natural and hatchery steelhead annually. If the abundance of wild steelhead in the Touchet River drops below a rolling three-year average of 140 fish, WDFW will consider regulation changes and steelhead-directed fishery closures.

The WDFW does not implement steelhead-directed fisheries in the Yakima River basin for three primary reasons:

- There is no hatchery program in the basin.
- The goal to recover the indigenous Yakima River steelhead.
- The Yakima River steelhead is currently below the NMFS interim abundance target of 10,500 natural spawners per year (Table 1).

The WDFW will consider opening a steelhead-directed fishery in the Yakima River if the run size is consistently above NMFS' interim abundance target, or if a successful hatchery supplementation program is implemented. In that event, only fin-clipped hatchery fish would be harvested. NMFS will be consulted prior to opening a steelhead-directed fishery in the Yakima River.

The WDFW will manage fisheries in the Klickitat and White Salmon river basins at an impact rate of 10 percent or less on wild steelhead populations. Without run size data, impacts can be estimated using fishery and run timing, estimates of encounters of wild fish, and hooking mortality. Based on local biologist's knowledge of the Klickitat and White Salmon rivers, the highest interception occurs on the White Salmon River winter steelhead, at 70 percent of the wild run (D. Rawding, WDFW, pers. comm). Using a hooking mortality rate of 5.1 percent, the highest impact rate in these two basins is estimated at 3.5 percent of the wild White Salmon winter steelhead run (0.70*5.1% = 0.0357).

The WDFW will authorize steelhead fisheries in river systems without hatchery steelhead only if the local natural stock has achieved the recovery criteria established by NMFS. In such case the WDFW would consult with NMFS to develop guidelines by which a fishery might be implemented.

II. SALMON

The WDFW will coordinate annual harvest management of salmon during recreational fisheries in tributaries of the MCMA with Columbia River mainstem fisheries. This process uses annual salmon run size forecasts developed by TAC and other Columbia River fisheries managers. The TAC estimates regional stock run sizes, rather than individual tributary stock run size. Regional stocks in the MCMA include upriver brights, upper Columbia spring chinook, and Bonneville Pool Hatchery–White Salmon River tule fall chinook are considered part of this stock. Annual run size forecasts are used during the North of Falcon process, during which harvest allocations of these regional stocks are set, and annual tribal and non-tribal fishery guidelines are established. Harvest of salmon during recreational tributary fisheries will be managed within the allocation frameworks set for each regional stock

The WDFW will also coordinate salmon harvest with local tribal management. For example, recreational spring chinook fisheries in the Yakima River are managed in cooperation with the YN to maintain an overall fisheries exploitation rate at about 20 percent of the run. The WDFW also relies on pre-season forecasts and in-run monitoring data collected by the YN. The WDFW will also working with the CTUIR on the reintroduction of spring chinook in the Walla Walla River basin.

Unlike hatchery steelhead, not all hatchery salmon are marked for identification. This leads to the potential for direct harvest. Direct harvest of LCR fall chinook may occur in the White Salmon River. Hatchery tule fall chinook stray into the White Salmon River, many from the Spring Creek NFH, along with hatchery fall bright chinook, and therefore, fisheries directed on fall chinook are permitted. To minimize impacts to listed LCR chinook, WDFW has included safeguards during tributary fisheries. These include the closure to the retention of chinook from October 1 through December and the closure of all fisheries upstream of the powerhouse during low water periods from mid-June to mid-November.

III. RESIDENT SPECIES

Resident trout fisheries indirectly impact listed salmon and steelhead. The WDFW reduce incidental harvest of listed salmon and steelhead by implementing timing and area closures, size restrictions, and bag limits. To further reduce impacts to listed salmon and steelhead, WDFW eliminated hatchery trout releases in anadromous zones of rivers and streams in the MCMA.

Recreational fishing seasons are designed to maximize catch of bass, walleye, catfish, crappie, yellow perch, sunfish, whitefish, northern pikeminnow, sturgeon, and carp. The number of steelhead and salmon caught in these fisheries is believed to be small, but little specific data exist for MCMA tributaries. The management of these species includes timing and area closures to all but eliminate harvest (incidental morality) of listed salmon and steelhead.

The WDFW conducted a creel survey on the lower Yakima River from April 16-June 15, 2003 in response to changes in the bass fishing regulations. There were 416 anglers contacted during the survey and no encounters with steelhead or trout were reported (Hoffarth 2003).

1.4.1) Provide escapement objectives and/or maximum exploitation rates for each population (or management unit) based on its status.

I. ESCAPEMENT OBJECTIVES

A. STEELHEAD

1. Region 1

The WDFW has not established an escapement objective for the Walla Walla River steelhead stock because most spawn in Oregon. The NMFS has established an interim goal for stock recovery of all steelhead in the Walla Walla River basin. The NMFS established an annual Walla Walla River basin-wide interim target of 2,600 wild spawners (Table 1). This interim abundance target includes all steelhead populations in the Walla Walla River basin, including the Touchet River steelhead.

The management of fisheries in the Touchet River is based on two escapement objectives for Touchet River steelhead, one for wild spawners and the other for hatchery program needs. An escapement goal of 600 wild adult steelhead spawners in the Touchet River has been established by the WDFW (WDF and WDW 1993). This goal is based on rearing potential of the system and a standardized stock-recruitment relationship (Gibbons et al. 1985). The endemic hatchery program for Touchet River steelhead requires 88 endemic hatchery or natural origin steelhead for its broodstock (WDFW 2001a).

B. Region 3

The WDFW established an annual escapement goal of 2,000 wild Yakima River steelhead (WDF and WDW 1993). This goal is based on rearing potential of the system and a standardized stock-recruitment relationship (Gibbons et al. 1985). The NMFS has established an annual interim abundance target of 10,500 wild spawners for recovery of the Yakima River steelhead (Table 1). This number is further divided into four separate populations within the basin (Table 1).

C. Region 5

Steelhead populations in the White Salmon and Klickitat rivers and Rock Creek have not been well documented. Insufficient data are available to develop escapement goals for either summer or winter runs in the White Salmon River and Rock Creek. The escapement goal for both wild summer and winter steelhead in the Klickitat River basin is 2,965 fish (WDF and WDW 1993). The NMFS has established an annual interim abundance target of 2,600 Klickitat River steelhead for recovery. The interim abundance target did not separate summer and winter runs.

B. SALMON

The annual natural spawning escapement objective for tule fall chinook in the White Salmon River is 200 fish. This objective was developed from the average escapement from 1995 to 1999. This is the only listed salmon population in tributaries of the

MCMA.

II. MAXIMUM EXPLOITATION

A. STEELHEAD

The WDFW will manage fisheries in the MCMA to maintain exploitation of wild steelhead to 10 percent or less. This rate is conservative compared to exploitation limits discussed in Chilcote (2001) and Rawding (2000a). These studies demonstrated exploitation rates less than 20 and 37 percent respectively would not lead a population to extinction. All WDFW fisheries in the MCMA requires wild steelhead release eliminating direct harvest of listed mid-Columbia steelhead. Mortality of listed steelhead from recreational fisheries is limited to incidental hooking. If escapement goals cannot be monitored closely, fisheries will be management to minimize incidental hooking mortality.

In selective fisheries, such as the fisheries described in this FMEP, the exploitation rate of wild steelhead is the same as hooking mortality, no direct harvest occurs. A strong positive correlation between water temperature and hooking mortality has been demonstrated (Mongillo 1984; Rawding 2000b). Water temperature less than 50°F (10°C) provides optimum survival, while temperatures greater than 60°F (15.5°C) increase mortality rate of for salmon and steelhead. Based on British Columbia studies summarized by Hooton (1987), steelhead hooking mortality ranged from 1 percent to a maximum of 5 percent in waters 10°C or less. To be conservative, the WDFW estimates a hooking mortality rate of 5.1 percent during steelhead and spring chinook fisheries in the MCMA, with the exception of a 10 percent mortality rate for summer steelhead in Region 5. If fall chinook fisheries are implemented, a 10 hooking mortality rate in estimated (ODFW and WDFW 2000; Bendock and Alexandersdottir 1993).

B. SALMON

The WDFW fisheries in the White Salmon River will have an estimated exploitation rate of less than 0.3 percent of the LCR fall chinook run. This rate was estimated from the total wild run size, annual harvest rate, and creel and spawning survey data as follows:

a. The estimated average total run size of the wild component of the LCR fall chinook was 11,343 during 1995 through 2001 (ODFW and WDFW 2000; TAC 2002a).
b. During 1995 through 1999, average annual catch of LCR fall chinook in White Salmon River fisheries was approximately 232 fish (K. Harlan, WDFW, pers. comm.; Washington State Sport Catch Reports 1995-1999).
c. Creel and spawning ground survey data indicate that 14 percent (32 fish) of the annual fall chinook catch in White Salmon River is Spring Creek hatchery fall chinook. The remainder of the catch is made up of 15 percent (30 fish) tule fall chinook, and 85 percent bright fall chinook (170 fish) (K. Harlan, WDFW, pers. comm.).
d. A total of 30 wild LCR tule fall chinook is the estimated harvest during WDFW tributary fisheries in the White Salmon River. The 30 wild LCR tule fall chinook caught in the White Salmon River is divided by the total run size of 11,343 wild LCR

tule fall chinook to provide an estimated 0.3 percent exploitation rate of the wild component of the LCR tule fall chinook during WDFW tributary fisheries.

The estimated 0.3 percent impact on the Lower Columbia River Chinook ESU is an overestimate of the total exploitation of the ESU as a whole. The spring chinook portion of the ESU were not included in the impact rate assessment. There are no listed spring chinook populations originating from the MCMA. Figure 5 illustrates the recent trend in the chinook salmon catch in the White Salmon River.

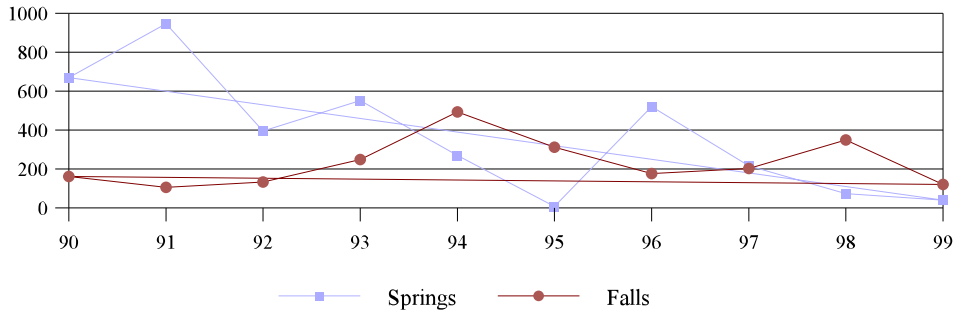

Figure 5. Total recreational chinook caught in the White Salmon River based on CRCs. Data recording errors and fish misidentification may be represented in these data, along with dip-in fish destined for upriver systems.

The exploitation rate of White Salmon River tule fall chinook during WDFW-regulated fisheries in the White Salmon River is less than 5 percent of the terminal run. The terminal run size is estimated based on the annual catch rate and spawning escapement estimate data collected since 1995. The annual catch of wild tule fall chinook is approximately 30 fish and the annual escapement estimate is 461, therefore the annual terminal run of White Salmon River tule fall chinook is approximately 491 fish. Total run size of the White Salmon River tule fall chinook and total fisheries impact can be extrapolated from these data. Using the estimated annual terminal run size and estimated annual exploitation from ocean and Columbia River mainstem fisheries, the estimated average total run size of White Salmon River tule fall chinook is 784 fish (K. Harlan, WDFW, pers. comm.; NMFS

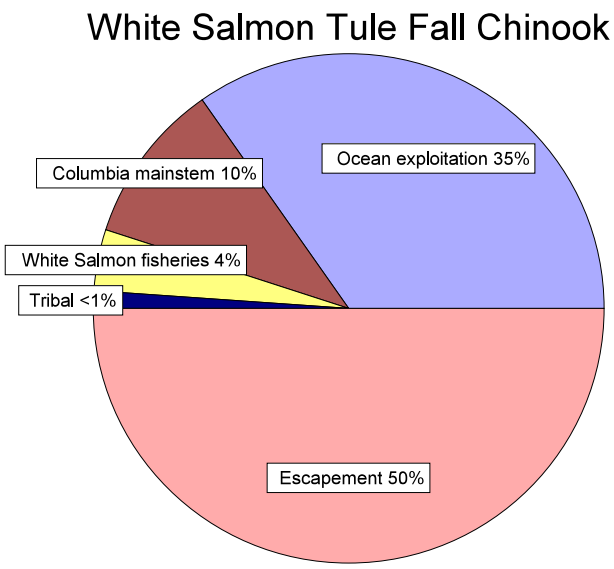

Figure 6. Distribution of the estimated annual White Salmon tule fall chinook run (n = 784) based on data collected since 1995 (K. Harlan, WDFW; NMFS 2002b).

2002b). The WDFW fisheries in the White Salmon River will harvest approximately 4 percent of the total run of the White Salmon River tule fall chinook (30/784 = 0.04) (Figure 6).

1.4.2) Description of how fisheries will be managed to conserve the weakest population or management unit.

I. FISHERIES

Fisheries included in this FMEP are directed at surplus hatchery fish while minimizing impacts to depressed wild salmon and steelhead stocks. The WDFW uses gear, timing, and harvest regulations to optimize harvest of targeted fish and minimize impacts to listed fish. If WDFW determines through monitoring activities discussed in Section 3.1 below, that risks are unacceptable to listed stocks; timing, area, and gear restrictions will be adjusted. The WDFW has developed conservative measures to protect both juvenile and adult fish. Methods to reduce encounters and mortality of listed fish include:

- Require releasing of wild steelhead during steelhead fisheries.
- Replace resident trout consumptive fisheries with catch-and-release fisheries in the upper Yakima River basin.
- Close stream systems to steelhead-targeted fisheries. For example, steelhead fisheries are not implemented in the Yakima River basin, including all its tributaries, or in any tributaries to the Touchet and Walla Walla rivers and Mill Creek.
- Set fishing seasons to occur where and when listed fish are least likely to be encountered. For example, important spawning grounds in the White Salmon River are closed to fishing for any species from mid-June to mid-November to protect fall chinook runs. Resident trout and game fish fisheries in the Touchet River basin and much of the Walla Walla River and its tributaries are closed when wild steelhead begin to arrive in the spawning grounds, and remain closed until smolts have outmigrated. Fall chinook and coho fisheries are closed in important Yakima River steelhead staging areas (around the confluence of Satus and Toppenish/Simcoe creeks) to prevent disturbance to Yakima River steelhead.
- Closed fisheries in important habitats. For example, the Klickitat River is closed to all WDFW-regulated fisheries upstream of the YN Reservation boundary. All tributaries to Mill Creek are closed to fishing to protect wild steelhead. All fisheries are closed in tributaries of the North, South, and Wolf forks of the Touchet River to protect listed steelhead. A 3,500-foot section of the Yakima River, downstream of Roza Dam is closed to all fishing, except for December through February whitefish fisheries.
- Imposed selective gear rules and single barbless hooks and no bait restrictions in selected fisheries. For example, selective gear rules are imposed during fisheries for trout and game fish in important steelhead spawning habitat in the Yakima River and many of its important tributaries (Naches, Bumping, American, and Little Naches rivers, and Rattlesnake, Taneum, Teanaway, and Naneum creeks), and in the upper Mill Creek and Touchet River. Barbless hook restrictions are imposed during steelhead fisheries in the Walla Walla River basin. Non-buoyant lure restrictions are imposed for all targeted species in the White Salmon River when fall chinook are present.
- Require the release of juvenile salmon during resident species fisheries.

- Set size limits to protect juvenile salmon and steelhead, for example, the 14-inch minimum size limit on resident trout in the White Salmon River, 12-inch minimum size limit in the Yakima River basin and Klickitat River, and 8-inch minimum size limit in the Walla Walla River basin.
- Impose daily bag limits, which may reduce fishing effort.

II. STOCK ASSESSMENTS

The WDFW uses several different monitoring techniques to collect data during stock assessments. For each technique, WDFW will implement procedures to conserve listed salmon and steelhead stocks. Hook-and-line sampling will avoid the use of multiple hooks and bait that could lead to excessive damage to either listed species or other species captured. Samplers will avoid extended "playing" of hooked fish, instead, retrieving the fish quickly to minimize loss of energy reserves. Gullet-hooked fish will be released by cutting the leader, rather than extracting the hook. Every effort will be made to keep captured fish in the water during sampling and before release. Surveyors will minimize the time fish are de-watered during survey and sampling work.

Electrofishing will be conducted according to WDFW and NMFS guidelines, which include using the equipment and a combination of voltage and amperage appropriate to the body of water and size of fish being sampled.

Fish will be captured and handled during biological sampling in a manner that minimizes abrasion and injury to the fish. All fish captured in traps will be released at the point of capture, or above or below fish traps, as appropriate. Fish captured with hook and line, nets, or by electrofishing will be released near the point of capture.

1.4.3) Demonstrate that the harvest regime is consistent with the conservation and recovery of co-mingled, natural-origin populations in areas where artificially propagated fish predominate.

Washington Department of Fish and Wildlife fishing regulations do not allow the harvest of adult wild steelhead in the MCMA. All *O. mykiss* over 20 inches caught in anadromous zones are considered steelhead. If these fish have intact adipose and ventral fins, they are considered wild steelhead and cannot be legally retained.

The WDFW has proposed a fishery regime consistent with rebuilding Mid-Columbia River steelhead and White Salmon River tule fall chinook stock. The WDFW is moving toward selective fisheries for fall chinook, but funding issues and negotiations with co-managers still remain unresolved. The fall chinook harvest regime is consistent with maintaining and rebuilding populations by regulating tributary fisheries to minimal harvest rates. As discussed in Section 1.4.1, White Salmon River salmon fisheries will have a 0.3 percent impact on listed LCR chinook.

Juvenile chinook are not intercepted in most of the WDFW fisheries because their small size does not allow them to recruit to tributary fisheries (Waples et al. 1991). Age 1+ juvenile steelhead may recruit to the trout fishery. In recognition of this, WDFW delays the opening of the trout season until June 1, when 95 percent of the steelhead migrants have emigrated from the tributaries (Myers et al. 1998). In addition, the eight-inch minimum size restriction in tributary fisheries protects 99 percent of the juvenile steelhead (WDFW 1999; D. Rawding and J. Bumgarner, WDFW, pers. comm.). Some mainstem tributaries, such as White Salmon, Klickitat, Yakima, and Naches rivers, have 12-inch minimum size restrictions to further protect juvenile salmonids. Anglers are not allowed to harvest resident juvenile salmon, but if anglers do misidentify them, size restrictions imposed during WDFW fisheries protect more than 99 percent of them from harvest.

The adipose fin of most WDFW hatchery-reared steelhead are clipped prior to release allowing WDFW to target recreational fisheries on hatchery-origin steelhead. The WDFW requires the release of wild steelhead during steelhead fisheries. Also, to minimize risk for genetic introgression, hatchery smolt release sites provide high harvest potential, are at adult collection facilities, or are in lower river areas away from wild production areas.

The WDFW hatchery programs have developed hatchery steelhead stocks to be early returning runs. Through a progression of selective capture of the earliest returning hatchery steelhead, spatial and temporal separation has been created between hatchery-origin and wild steelhead stocks. For example, return and spawn timing of Skamania hatchery summer steelhead are three months earlier than wild fish (Hulett et al. 1998). These hatchery steelhead are released into the White Salmon and Klickitat rivers. Spatial and temporal separation at spawning have helped to maintain genetic differences between hatchery and wild fish, and to target a fishery on the earlier returning hatchery steelhead.

The WDFW-regulated steelhead fisheries in the Walla Walla River basin allow the harvest of only hatchery-produced (adipose-clipped) steelhead. All wild fish must be released. Hatchery fish are released in the mid- to lower basin for harvest augmentation as part of the LSRCP. Therefore, fishing seasons have not been set based on wild fish abundance, but to maximize harvest of hatchery fish and minimize adverse impacts to wild steelhead and bull trout.

1.5) Annual Implementation of the Fisheries.

I. GENERAL FISHERIES REGULATION PROCESS
Recreational fisheries described in this FMEP are established through the Washington Fish and Wildlife Commission (the "Commission") and implemented by WDFW. The Commission consists of nine citizens appointed to six-year terms by the Governor of Washington. The Commission meets throughout the year in public forums and is responsible for setting policy for WDFW.

The recreational fisheries rule adoption process is conducted on a two-year basis, consisting of a

"major year" and a "minor year." The "major year" regulation cycle occurs biennially and begins in the spring when stakeholders (tribes, the public, and other constituents) and WDFW staff are asked to proposal fishery regulation changes. In September, WDFW managers and technical staff evaluate these proposals to determine which to accept for the upcoming fishing season. At this point WDFW staff evaluate the accepted proposals for their compliance with this FMEP. If a proposal does not comply with this FMEP it will be modified to comply, or withdrawn from consideration. In October, the stakeholders and NMFS are given the opportunity to comment on the accepted proposals. At the end of the year, the Commission closes the comment period and takes oral testimony from the stakeholders in an open meeting. In February of the following year, the Commission meets to adopt rules, after which the stakeholders are notified. These adopted rules become permanent regulations implemented annually (Appendix A).

The "minor year" cycle is an abbreviated process of the "major year" regulation cycle, occurring during alternate years from the "major year" cycle. During this cycle, WDFW staff submit proposals for changes to fishery regulations based on conservation concerns, housekeeping issues, significant recreational opportunities, and Commission requests or rules from other forums. Stakeholder proposals are not solicited, although WDFW staff may include recommendations from the public along with the staff-generated proposals. As with the "major year" cycle, proposals are evaluated by WDFW staff in September for compliance with this FMEP. If a proposal does not comply with this FMEP it will be modified to comply, or withdrawn from consideration. In October, the stakeholders and NMFS are given the opportunity to comment on the accepted proposals. By December, the WDFW Director's office approves proposals to be sent to the Commission. The Commission will then review the proposals, solicit public comments, accept written comments, and hold a public hearing on the proposals. The Commission meets in February to adopt rule changes as permanent fishery regulations (Appendix A).

II. EMERGENCY RULE CHANGE

The WDFW may temporarily change fishing regulations through the emergency rules process under the Revised Codes of Washington (RCW). The RCW 34.05.350 allows a state agency with good cause to adopt, amend, or repeal a rule (Washington Administrative Code) on an emergency basis. An emergency rule adopted under this process takes effect upon filing with the code reviser and may remain in effect no longer than 120 days. Staff from WDFW submit Emergency rules proposals for approval by the following programs within the WDFW:

- Fish Program, to evaluate compliance with this FMEP and other Fish Program objectives.
- Enforcement, which would be responsible for enforcing the proposal rule change.
- Director's office, which oversees all WDFW programs.

Proposals for emergency rule changes can be submitted by WDFW staff any time during the year. Many of these proposals are based on in-season run size monitoring of dam counts and fish returning to hatchery facilities.

III. STEELHEAD

Steelhead fisheries in the MCMA are opened annually in the MCMA from June through October unless otherwise changed in the general fisheries regulation process or by an emergency rule change (Appendix A). Through the general fisheries regulation process, WDFW can adjust steelhead fishery seasons and regulation and restrictions associated with them. These adjustments then become the new permanent seasons and regulations (Appendix A). The WDFW can also adjust these seasons and regulations through the emergency rules process. These adjustments are temporary, expiring in 120 days. Adjustments made through the emergency rules process are usually based on information collected during monitoring activities of steelhead run sizes or pre-season run forecasts.

IV. SALMON

The WDFW salmon fisheries are closed annually unless otherwise opened through the general fisheries regulation process or by emergency rules. If WDFW opens and sets regulations and restrictions for salmon fisheries through the general fisheries regulation process, they become permanent and are printed in the annual regulation pamphlet (Appendix A). They are then considered open annually unless changed in the general fisheries regulation process or by emergency rules. The WDFW can also open and set regulations for salmon fisheries through the emergency rules process. Fisheries open through this process are only temporary, expiring in 120 days.

Before opening a salmon fisheries in tributary waters, WDFW takes into consideration run abundance, tribal fishery needs, and harvest allocations set during the PFMC/North of Falcon and *U.S. vs. Oregon* processes. The WDFW uses data collected by tribal, TAC, and other Columbia River fisheries managers when evaluating salmon fisheries in tributary river systems. These data include historic and current spawning escapement estimates, pre-season run size forecasts, and in-season run monitoring data. The WDFW will also coordinate seasons and harvest impacts with tribal co-managers on a local river system basis, and over all fisheries impact in relation to harvest allocations set in the PFMC/North of Falcon.

A. PRE-SEASON RUN FORECAST and *U.S. vs. Oregon*.

The TAC annually forecasts pre-season run sizes for salmon stocks in the MCMA. Chinook are grouped into regional populations rather than individual tributary stocks during the pre-season forecasting process. Regional chinook populations found in the MCMA include Upriver Bright fall chinook (URB), Mid-Columbia Bright fall chinook (MCB) upper Columbia spring chinook, and Bonneville Pool Hatchery (BPH) fall chinook. White Salmon River tule fall chinook are considered part of the Bonneville Pool Hatchery population. For more details concerning the development of pre-season forecasts see TAC (2002b).

The run size forecasts for these regional populations are then used in the Pacific Fisheries Management Council (PFMC)/North of Falcon process where harvest allocations and recreational and commercial fishery seasons are set. Fisheries addressed in this process are ocean and Columbia River mainstem commercial and recreational fisheries.

B. IN-SEASON RUN SIZE UPDATE

Salmon and steelhead run sizes are updated in-season by TAC based on Columbia River dam counts and mainstem fisheries below McNary Dam (TAC 2002b). Fish counts at Bonneville Dam are monitored and compared to historic levels to assess the current year's run size progress. Pre-season run forecasts can then be updated based on the progress of the run size.

The WDFW monitors the number of hatchery-origin fish returning to hatcheries. Based on the number of returning fish and their timing, WDFW is able to update pre-season run forecasts and make decisions on current fisheries management.

VII. INTERCEPTION FISHERIES

A. Ocean

Ocean fisheries rely heavily on Columbia River salmon stocks for harvest. Because of this, the PFMC process uses pre-season run size forecasts developed by TAC and other Columbia River fishery managers to produce exploitation options for ocean commercial and recreational fisheries. The PFMC manages and regulates ocean fisheries in the U.S. Exclusive Economic Zone off the coasts of Washington, Oregon, and California. These options are then discussed and evaluated during the North of Falcon process, which selects the option that provides enough salmon for ocean and Columbia River fisheries and for spawning and hatchery escapement.

B. Mainstem Columbia River

Columbia River mainstem fisheries are managed through *U.S. vs. Oregon* and the Compact. The *U.S. vs. Oregon* mandates state fisheries managers to provide salmon to treaty Indian tribes. These and other salmon needs in the Columbia River basin are considered in the PFMC/North of Falcon process. Initial Columbia River fishing seasons are designed during the PFMC/North of Falcon process to ensure that escapement goals and freshwater fishery needs are met prior to the establishment of ocean fisheries. Actual salmon seasons in the Columbia River are set by the Compact for the portion of the mainstem Columbia River where the states of Oregon and Washington share a common boundary. The Compact, composed of representatives from ODFW and WDFW, receives input from the tribes, states, the federal government, and the fishing industry through a series of meetings held throughout the year to set yearly regulations.

SECTION 2. EFFECTS ON ESA-LISTED SALMONIDS

2.1) Description of the biologically-based rationale demonstrating that the fisheries management strategies will not appreciably reduce the likelihood of survival and recovery of the affected ESU(s) in the wild.

Salmon and steelhead fishery management by WDFW will not appreciably reduce survival and recovery of wild salmon and steelhead populations because:

- Fisheries will cause less than 10 percent impact on each listed salmon and steelhead stock.
- Fisheries are closed during important spawning and outmigration periods.
- Fisheries are selective for hatchery-produced steelhead.
- All wild steelhead must be released, unharmed, back into the water.
- Sanctuary areas have been established in many of the basins to protect important production areas.
- Gear restrictions have been developed to reduce impacts and improve survival of incidentally hooked wild salmon and steelhead.

I. STEELHEAD

To conduct effective Risk Assessments or Population Viability Analyses, time-series data for spawning escapement estimates, recruitment, and productivity are required. Carrying capacity and habitat productivity are other parameters necessary for accurate population analysis. These data are generally lacking for all steelhead stocks within the MCMA. Although Hood River steelhead data were used earlier in this document to represent Klickitat River steelhead status, Kalama River steelhead data will be used as a surrogate for the MCMA for risk assessments and fisheries impact analyses. Data pertaining to Kalama River steelhead and fisheries impacts are more comprehensive than for other Mid-Columbia River tributaries.

Although the Kalama River is outside the MCMA, the summer and winter steelhead runs are similar in run timing to steelhead in the White Salmon and Klickitat rivers, and fisheries are comparable. Data available for steelhead runs in the Kalama River are considerably more complete than those for the White Salmon and Klickitat rivers. Rawding (2000a) calculated extinction harvest rates for summer and winter steelhead in the Kalama River during low ocean productivity using a stock-recruitment analysis. Extinction harvest rates in this context are defined as harvest from all sources, including fisheries, research, and habitat degradation, that if continued will eventually lead to extinction. For extinction to occur, harvest rates above the threshold must occur for 10 generations, or 50 years. These rates were 37 percent for Kalama summer steelhead and 56 percent for Kalama winter steelhead, respectively (Rawding 2000a). If harvest rates exceed these levels during low ocean productivity for more than a generation, survival and recovery of the species may be in jeopardy. Therefore, harvest rates should be set below these levels.

Maximum sustainable yield (MSY) harvest rates were also calculated during low ocean

productivity, and were 22 percent and 37 percent for summer and winter steelhead, respectively. Although the data set did not measure observational error, this error was likely small, since most fish are trapped at Kalama Falls (Rawding 2000a). The NMFS explicitly recognizes the MSY concept in McElhany et al. (2000) and states "Assuming MSY is actually being achieved, a wild population harvested at MSY is, by definition, sustainable (VSP) – provided that the time horizon of MSY is the same as VSP and the MSY estimate takes into account all the factors affecting viability, such as genetic diversity and spatial structure."

The harvest regime discussed in this FMEP estimates tributary harvest impacts to local listed steelhead populations to be less than 10 percent. Comparing these impacts to MSY, harvest impacts on listed steelhead during WDFW-regulated steelhead fisheries are well below what NMFS has stated as sustainable levels. Tributary harvest impacts are also well below the harvest extinction rate.

In the selective fishery for hatchery-origin steelhead described in this FMEP, the exploitation rate of wild steelhead is related to hooking mortality. Based on steelhead run and fisheries timing the highest interception rate in the MCMA occurs on the White Salmon River winter steelhead. The interception rate is estimated at 70 percent. Given this is a winter run, hooking mortality of 5.1 percent is expected. The exploitation rate for White Salmon River winter steelhead is estimated to be 3.6 percent. The highest exploitation rate of steelhead in the MCMA during all WDFW-regulated fisheries occurs on the Klickitat River summer steelhead. The interception rate for this run is estimated at 63 percent. Using the 10 percent hooking morality for fisheries during warm water time periods, exploitation of the Klickitat River summer steelhead is estimated to be 6.3 percent (Table 9 in Section 2.1.3).

The WDFW closes all tributaries in the upper Touchet River and Mill Creek watersheds to all fishing, providing sanctuaries in these important production areas. Steelhead fisheries are closed in all tributaries to the Walla Walla and Touchet rivers and upper Mill Creek watershed to protect spawning and rearing steelhead.

Insufficient data are available to conduct a Risk Assessment or Population Viability Assessment for steelhead in the Walla Walla River basin. Although many years of adult escapement and juvenile density estimates have been made, and data collected to estimate potential juvenile productivity in individual streams, insufficient comprehensive data are available. The WDFW will continue to collect these data, as well as conduct other proposed activities, such as updating counting facilities and expanding spawning ground and snorkel surveys, to help close the gap for data needed to conduct appropriate assessments. The current endemic hatchery broodstock program has provided the opportunity to estimate steelhead fecundity, a necessary component in Population Viability Assessments.

To protect wild steelhead, WDFW has not opened a fishery directed at steelhead in Yakima River drainage since April of 1994. The WDFW does not anticipate opening a fishery directed at steelhead at this time. Yakima River steelhead are further protected, because nearly 60 percent of

their production occurs in basins closed to all fisheries. These basins are located on the Yakama Indian Reservation and includes Satus and Toppenish-Simcoe creeks (Hockersmith et al. 1995). The WDFW provides additional protection to Yakima River steelhead by closing salmon fisheries in waters typically used by steelhead as holding areas. These waters include the downstream side of Roza Dam and around the confluences of Satus and Toppenish/Simcoe creeks where deep holding pools provide refuge for steelhead that are staging prior to entering these important spawning tributaries. Other important spawning tributaries in the Yakima River basin, such as the Naches, Bumping, American, and Little Naches rivers; and Rattlesnake, Teneum, Teanaway, and Naneum creeks have selective gear rules imposed during trout and other resident species fishery to reduce potential incidental impacts to the listed steelhead.

II. SALMON

Fishing rates identified in this plan do not appreciably reduce the likelihood of survival or recovery of tule fall chinook salmon or summer or winter steelhead. The Recovery Exploitation Rate (RER) established by NMFS was adopted for LCR tule fall chinook fishery impacts that occur in fisheries regulated by the Pacific Salmon Treaty. By definition, these rates do not appreciably reduce the likelihood of survival or recovery of these fish (NMFS 2000c). For LCR tule fall chinook, a maximum RER of 49 percent was established for all fisheries combined (ocean, Columbia River mainstem, tribal, and tributary). According to NMFS, the 2002 ocean fishery exploitation rate of LCR tule fall chinook is expected to be 35 percent and the fall Columbia River mainstem fishery harvest rate is expected to be 10 percent (NMFS 2002b). Tribal and WDFW-regulated recreational White Salmon River fisheries exploitation of LCR tule fall chinook are expected to be less than 1 percent each, resulting in total fishery exploitation of LCR tule fall chinook of less than 47 percent during the 2002 season.

Fisheries regulated by WDFW in the White Salmon River will have an estimated 0.3 percent impact on the wild fall chinook portion of the LCR chinook ESU. This estimate is based on the total wild run size, annual harvest rate, and creel and spawning survey data as follows:

a. Estimated average total run size of the wild component of the LCR fall chinook since 1995 is 11,343 fish (ODFW and WDFW 2000; TAC 2002a).
b. During 1995 through 1999, the average annual catch of LCR fall chinook in White Salmon River fisheries was approximately 232 fish (K. Harlan, WDFW, pers. comm.; Washington State Sport Catch Reports 1995-1999).
c. Creel and spawning ground survey data from White Salmon River indicate that 14 percent (32 fish) of the annual fall chinook catch is Spring Creek hatchery fall chinook. The remainder of the catch is made up of 15 percent (30 fish) tule fall chinook, and 85 percent bright fall chinook (170 fish)(K. Harlan, WDFW, pers. comm.).
d. A total of 30 wild LCR tule fall chinook is the estimated harvest during WDFW tributary fisheries in the White Salmon River. The 30 wild LCR tule fall chinook caught in the White Salmon River is divided by the total run size of 11,343 wild LCR tule fall chinook to provide an estimated 0.3 percent exploitation rate of the wild component of the LCR tule fall chinook during WDFW tributary fisheries.

The estimated 0.3 percent impact on the Lower Columbia River Chinook ESU is an overestimate

of the total exploitation of the ESU as a whole. The spring chinook portion of the ESU were not included in the impact rate assessment. There are no listed spring chinook populations originating from the MCMA.

III. RESIDENT SPECIES FISHERIES

The Klickitat River basin is closed to trout angling during the winter and early spring, which protects over-wintering and spawning steelhead populations. Summer steelhead entering the river in summer and fall remain in holding areas until spring spawning commences. Winter steelhead begin to enter the river in late fall creating denser populations of steelhead in holding areas. By closing all trout fisheries during winter and early spring, WDFW is able to minimize incidental mortality to wild steelhead populations and reduce disturbance and stress. To further protect steelhead, a minimum size restriction of 12" is imposed during trout and steelhead fisheries. This is to protect outmigrating and rearing juvenile steelhead.

Steelhead encounters are negligible in Rock Creek and other small independent tributaries entering the Columbia River within the MCMA (D. Rawding, WDFW, pers. comm.). Salmon-directed fisheries are not implemented in these tributaries and summer flows are too low for steelhead access. Flows within these tributaries are greatly influenced by precipitation. Steelhead destined to spawn in these tributaries must wait for the fall or winter rains before entering these tributaries. In most years, flows do not increase to levels that provide access for steelhead until after the general trout and steelhead seasons are closed. Juvenile steelhead may be encountered during the general fishing season, however, the eight-inch minimum size restriction will prevent direct harvest of most juvenile steelhead, and delaying the opening of the general trout season until June allows most steelhead smolts to leave the systems prior to the opening of fishing.

Nearly 60 percent of the Yakima River steelhead production occurs in basins closed to all fisheries. These basins are located on the Yakama Indian Reservation and includes Satus, Toppenish, and Simcoe creeks (Hockersmith et al. 1995). Other fishery closures include portions of the mainstem Yakima River remain closed to salmon fishing. These waters include the downstream side of Roza Dam and around the confluences of Satus and Toppenish creeks where deep holding pools provide refuge for steelhead that are staging prior to entering these important spawning creeks.

Resident species fisheries are not frequently monitored in anadromous stream in the MCMA. However, a creel survey was conducted in the lower Yakima River in 2002 to evaluate changes to bass fishing regulations. The creel survey was conducted from April 16 to June15 in a 28-mile stretch of the river, from Benton City to the Highway 240 bridge. No steelhead or trout were reported by any anglers interviewed during the survey (Hoffarth 2003).

Incidental hooking mortality during recreational fishing is a major cause of wild steelhead mortality. Mongillo (1984) noted that treble hooks and bait caused higher hooking mortalities to salmonids than single hooks and artificial lures. Selective gear rules applied in important

steelhead waters require the use of single barbless-hooks and artificial lures, among other restrictions, to further reduce fishery mortalities to wild steelhead. The WDFW imposes selective gear rules during resident trout and other game fish fisheries in important steelhead habitats in the Yakima River mainstem and most of its tributaries, and in Mill Creek and the Touchet River in the Walla Walla River basin.

Barbless hook restrictions and selective gear regulations reduce impacts to listed fish during recreational tributary fisheries. Barbless hooks are easier to remove from fish than barbed hooks, which reduces handing time. Reducing handling time minimizes stress on fish. Selective gear regulations are designed to reduce hooking mortality. Baits, as opposed to artificial lures and flies, are taken more aggressively causing more lethal hooking of fish (Mongillo 1984). Hooking mortality occurs at a lower rate using artificial lures and flies.

IV. STOCK ASSESSMENT

Stock assessments are an integral part of the fisheries management process. Stock assessments provide valuable information on spawning escapement, distribution, presence and absence, and run size forecasting. Spawning escapement provides a means to assess fishery impacts on a stock and the current-year run size. Data pertaining to fish distribution and presence and absence aid in determining where and when fisheries are to be opened. Forecasting future run size provides a cornerstone for annual fishery review and implementation.

Stock assessments can potentially take listed salmon and steelhead. Take can occur when fish are disturbed from their normal activities during spawning ground, redd, and snorkel surveys. Take can also occur when fish are handled during hook-and-line and electrofishing surveys. Precautions are taken during these survey activities to diminish the take of listed salmon and steelhead. Surveyors will make every effort not to disturb redds. Electrofishing surveys will be conducted following WDFW and NMFS guidelines. Hook-and-line surveys and sampling will avoid the use of multiple hooks and bait. These gears have been found to cause higher hooking mortality than artificial lures and barbless hooks (Mongillo 1984). Hooked fish with be retrieved as quickly as possible to minimize loss of energy reserves. To the extent possible, all fish handled during stock assessment activities will remain submerged in water. Estimated takes during stock assessment projects are listed in Table 6.

Table 6. Stock assessment approximate "take" table (includes takes from bull trout stock assessment surveys).

Listed stocks	Takes[1]						
	Handling				Incidental Mortality[2]		
Mid-Columbia Steelhead ESU	Egg/Fry	Juvenile	Adults	Carcass	Egg/Fry	Juvenile	Adults
White Salmon River	0	500	0	0	0	25	0
Klickitat River	0	500	0	0	0	25	0
Rock Creek	0	500	0	0	0	25	0
Walla Walla River basin	600	4,000	46	0	50	200	1
Yakima River	0	560	69	0	0	20	0
Total	**600**	**6,060**	**115**	**0**	**50**	**295**	**1**
LCR Chinook ESU							
White Salmon River	0	500	0	0	0	25	0
Total	**0**	**500**	**0**	**0**	**0**	**25**	**0**

[1] These numbers were estimated by local fisheries biologists, and based on the numbers of fish encountered during historic annual stock assessment activities.

[2] The estimated number or salmon or steelhead incidentally killed during stock assessment activities.

2.1.1) Description of which fisheries affect each population (or management unit).

Any fishery may potentially affect any listed salmon or steelhead populations within the MCMA. However, due to fishery management regulations incorporating time, area, and gear restrictions, WDFW has been able to largely restrict harvest impacts to the target species. Some fisheries, however may affect non-targeted listed stocks. Targeted chinook fisheries may impact steelhead. Targeted steelhead fisheries may impact chinook and steelhead stocks. Targeted trout and other resident fisheries may impact juvenile salmon and steelhead stocks (Tables 7 and 8).

Table 7. Tributary fisheries likely to affect wild summer steelhead stocks in the MCMA.

Summer Steelhead Stocks	Fisheries					
	Winter Steelhead	Summer Steelhead	Spring Chinook	Fall Chinook	Coho	Resident Fish
White Salmon	X	X	X	X	X	X
Klickitat		X	X	X	X	X
Rock Creek		X				X
Walla Walla		X				X
Touchet		X				X
Yakima			X	X	X	X

Table 8. Tributary fisheries likely to affect wild winter steelhead and tule fall chinook stocks in the MCMA.

Winter Steelhead and Chinook Stocks	Fisheries					
	Winter Steelhead	Summer Steelhead	Spring Chinook	Fall Chinook	Coho	Resident Fish
White Salmon winter steelhead	X					X
Klickitat winter steelhead						X
White Salmon tule fall chinook		X		X	X	X

I. STEELHEAD

Winter steelhead are native to the White Salmon and Klickitat rivers and most minor basins downstream of McNary Dam. Fisheries for winter steelhead typically occur from mid-November through mid-June in the White Salmon River. Retention is restricted to adipose fin-clipped hatchery steelhead. Small minor basins managed under statewide rules are open for trout and steelhead fisheries from June through October, while salmon fisheries are generally not open. Tule fall chinook are not present in the White Salmon River during winter steelhead fisheries.

Summer steelhead are native to all major basins and most minor basins within the MCMA. Summer steelhead enter rivers from March through October in the lower basins (White Salmon and Klickitat) and June through February in the Walla Walla River basin. Fisheries for summer steelhead open in May and run through November. Most steelhead are caught from June through September in the lower basins and September through February in the Walla Walla River basin. Fisheries for summer steelhead occur in all rivers in the MCMA under wild steelhead release regulations, except the Yakima River basin. Steelhead-targeted fisheries are not authorized in the Yakima River basin, due to the lack of hatchery programs and the current status of its stocks. Tributary closures also occur in the Walla Walla River basin. These closures are associated with natural production areas to protect natural spawners (See Appendix A). Summer steelhead fisheries in the White Salmon River may impact tule fall chinook, but impacts are believed to be minor for several reasons. These reasons are:

- Steelhead fishing effort is concentrated during evening and night time hours when steelhead catch is more productive, and salmon are less active.
- Steelhead fishing gear is smaller than gear typically used to catch salmon.
- Tule fall chinook are nearly mature when they reach the mouth of the White Salmon River and are not active biters (J. Hymer, WDFW, pers. comm.).

Harvest of salmon and steelhead in Drano Lake and the White Salmon and Klickitat rivers include dip-in fish that are destined for tributaries further up the Columbia and Snake river systems. Fish from these stocks spend a short period of time in these cool water refuges before continuing their upstream migrations. The effort in salmon and steelhead-directed fisheries occurring in the White Salmon and Klickitat rivers is concentrated in the lower reaches and in

Drano Lake where dip-in fish common. Impacts to dip-in fish caused by these fisheries on are addressed in the Columbia River mainstem fisheries Section 7/10 consultation process.

The contribution of dip-in hatchery steelhead in the Klickitat River harvest is small. Most of the hatchery steelhead are taken from river sections upstream of where dip-in fish are found, and the proportion of the harvest is primarily 2- and 3-salt fish typical of the Klickitat River steelhead (D. Rawding WDFW, pers. comm.). Upper Columbia River (UCR) and Snake River steelhead are predominately 1- to 2-salt fish. Also, the annual release of hatchery steelhead into the Klickitat River is 100,000 from the Skamania stock, producing up to 3,000 returning hatchery adults (WDFW 2001b).

The contribution of dip-in hatchery steelhead in the Little White Salmon and White Salmon river harvest is larger than that in the Klickitat River. Only 20,000 hatchery steelhead smolts are released into each of these systems. Using a 3 percent smolt-to-adult survival rate and 20,000 hatchery steelhead released into these tributaries, up to 600 hatchery adults can be expected to return to each tributary (WDW et al. 1990b; WDFW 2001c.). Although this does not account for all the steelhead harvest, a large portion is hatchery-origin fish from the Little White Salmon and White Salmon rivers.

Impacts from steelhead fisheries in the Little White and White Salmon rivers to the Upper Columbia River steelhead are a concern. Fish from this ESU utilize the cool water refuge that these two systems provide. Based on the number of hatchery steelhead released into the Columbia and Snake river basins from all hatchery facilities, no more than 10 percent of the dip-in harvest is expected to be UCR hatchery steelhead.(NMFS 1999). Roughly 10 percent of the hatchery steelhead smolts released into the Columbia River basin, upstream of Bonneville Dam, are considered UCR steelhead. Impacts to dip-in UCR steelhead from these fisheries are addressed in the Columbia River mainstem fisheries Section 7/10 consultation process

II. SALMON

The WDFW salmon fisheries are closed annually unless otherwise opened through the general fisheries regulation process or by emergency rules. Depending on adult salmon return strength, WDFW promulgates regulations allowing spring chinook, fall chinook, and coho salmon fisheries in MCMA tributaries. Recreational salmon fisheries are typically held from March to June or July in streams containing spring chinook runs. Streams with fall-run chinook are typically open from July through November or December. Coho fisheries typically overlap fall-run chinook fisheries in the MCMA.

Fisheries targeting spring chinook in the White Salmon, Klickitat, and Yakima rivers commence as fish begin entering the rivers in March or April, and typically close by June or July to protect spawners. Steelhead impacts during fisheries targeting spring chinook are believed to be low, because steelhead are in the upper watersheds in spawning habitat that are not open to spring chinook fisheries, and spring chinook fisheries occur when few steelhead are entering river

systems. Wild winter and summer steelhead are protected during these fisheries by wild steelhead release regulations. Tule fall chinook are not present during spring chinook fisheries.

Fisheries targeting fall chinook and coho occur from July to November or December in the White Salmon, Klickitat, and Yakima rivers. Impacts to White Salmon River tule fall chinook are minimized by a chinook release regulation imposed in the White Salmon River from October through December. Winter steelhead impacts during these fisheries are minimal. These fisheries are closed prior to when winter steelhead enter the river.

Summer steelhead are present during fall chinook and coho fisheries in the White Salmon, Klickitat, and Yakima rivers. The WDFW has implemented measures to minimize impacts related to fall chinook and coho fisheries on summer steelhead populations. Wild steelhead release regulations are imposed during all fisheries. Closures to fall chinook and coho fisheries in sections of the Yakima River where steelhead stage prior to entering spawning streams (around the confluences of Satus and Toppenish/Simcoe creeks) are imposed. Coho fisheries in the White Salmon River target hatchery-origin fish with wild coho release regulations.

Native salmon were believed to have been extirpated from the Walla Walla River basin several decades ago. However, within the past 10 years or so, spring and fall chinook have sporadically entered the basin and spawned in low numbers. These fish are likely hatchery strays, probably from the Umatilla River reintroduction effort by the Umatilla Tribe. Currently, WDFW does not authorize salmon fisheries in the Walla Walla River basin.

III. RESIDENT SPECIES FISHERIES

Trout fisheries will impact juvenile salmon and steelhead more than adult fish. So, WDFW has imposed timing and size restrictions designed to reduce these impacts. Limiting statewide trout seasons to June 1 to October 31 protects listed anadromous smolts during their outmigration, and protects fall-spawning species. The WDFW and other agencies operate juvenile outmigrant traps in Columbia River tributaries to determine the timing of wild salmon and steelhead smolt outmigrations. Over 95 percent of the wild steelhead and coho smolts had completed their migration by June 1 (Myers et al. 1998). The WDFW imposes minimum size restrictions on trout fisheries to protect juvenile salmon and steelhead. During the general trout season, an eight-inch minimum size restriction is imposed in tributary waters with a daily limit of two fish. The minimum size restriction is increased to 12 inches during trout fisheries in sections of the mainstem Klickitat and Yakima rivers and 14 inches in the White Salmon River to afford additional protection to trout and juvenile salmon and steelhead. In the MCMA, all wild adult steelhead and bull trout/Dolly Varden must be released.

The WDFW tributary fishing regulations prohibit the harvest of juvenile salmon in freshwater. However, WDFW recognizes that juvenile salmon caught by anglers may be misidentified as trout. As long as anglers comply with the minimum size restriction for trout, most wild salmon juveniles will be protected from direct harvest.

Fishing for whitefish is allowed during the general trout season, but may also be held during late fall to early winter, when whitefish congregate in deep pools preparing for spawning. Participation in the whitefish fishery within the MCMA is low (Glen Mendel, Dan Rawding, John Easterbrooks, WDFW, pers. comm.). Although low, effort during the whitefish fishery in the Yakima River is slightly higher than in the rest of the MCMA. The easily accessible reaches of the upper Yakima River tributaries and mainstem are periodically fished by experienced anglers. Anglers target whitefish during winter. To reduce incidental catch and release mortality of steelhead, WDFW restricted the number and size of hooks that can be used during whitefish fisheries.

The WDFW manages other resident game fish fisheries to target species such as bass, walleye, catfish, crappie, perch, sunfish, whitefish, northern pikeminnow, sturgeon, and carp. These fisheries occur primarily in lower river sections where flows are slower and temperatures are warmer. They may occur year-round in lower sections of the White Salmon and Walla Walla rivers and in much of the Yakima River mainstem, and from June through October in other tributaries. Effort by anglers in these fisheries is highest in summer when warm water temperatures permit successful angling.

The WDFW uses gear and timing restrictions during other resident game fish fisheries to protect salmon and steelhead. Selective gear rules are applied on most tributaries of the Yakima River. Night closure and non-buoyant lure restrictions are imposed in the White Salmon and Klickitat rivers. Barbless hook restrictions are imposed in the Walla Walla River basin during resident game fish fisheries.

Highest fishing effort during other resident fish fisheries typically occurs in mid to late summer, when water temperatures are warmest. This time period does not coincide with salmon or steelhead migration timings. Spring-migrating juvenile salmonids have left the tributaries and fall-migrating juvenile chinook have not yet dispersed from spawning ground to rearing areas. Impacts to chinook and steelhead during warmwater fisheries are extremely low. Since warmwater species potentially prey on and compete with juvenile salmonids, warmwater fisheries could actually provide some marginal benefit for listed salmon and steelhead.

2.1.2) Assessment of how the harvest regime will not likely result in changes to the biological characteristics of the affected ESUs.

Low harvest impact rates, which are expected to result from implementing selective fisheries for adipose-clipped hatchery steelhead and salmon fisheries discussed in this FMEP, will have little effect on the biological characteristics of wild salmonids. Fishing impact rates are small and spread over the breadth of a run, so no subcomponent of a wild stock will be selectively harvested at a rate substantially higher than any other portion of a run. No significant harvest differential will occur for size, age, or timed portion of a run. In addition, low exploitation rates for wild fish will result in an optimum proportion of wild spawners, even in periods of poor freshwater migration and ocean survival conditions. Finally, increased harvest rates of hatchery

fish in selective fisheries should benefit wild stock integrity and diversity by removing hatchery fish that could potentially stray into wild production areas.

2.1.3) Comparison of harvest impacts in previous years and the harvest impacts anticipated to occur under the harvest regime in this FMEP.

I. STEELHEAD

Recreational fisheries for steelhead occur within most river systems in the MCMA, except the Yakima River basin. Historically, these fisheries were directed at healthy wild stocks. As wild steelhead populations declined, fishery restrictions designed to limit harvest impacts, including time and area closures, were imposed. In the 1950s, hatchery steelhead were released to improve harvest opportunity in mainstem and tributary fisheries. In the 1980s and 90s large numbers of hatchery steelhead were released as mitigation for hydroelectric projects as part of the LSRCP and other Columbia River basin plans. Due to continued declines in wild steelhead populations, WDFW began to adopt wild steelhead release regulations in 1984, and by 1994 all steelhead fisheries in the MCMA required the release of wild steelhead. The wild steelhead release regulation directs harvest toward abundant hatchery steelhead populations, while protecting vulnerable wild steelhead.

Harvest of wild steelhead has dropped dramatically since wild steelhead release regulations were applied. However, very few data are available from MCMA tributaries concerning wild fish escapement and harvest estimates prior to wild steelhead release regulations. The exception is the Kalama River, where ongoing research programs collect data on wild steelhead escapement and harvest impacts. Although this Columbia River tributary is not in the MCMA, it represents the changes in wild steelhead harvest rates. Harvest rates for wild winter and summer steelhead declined from more than 50 percent during fisheries allowing wild steelhead retention to less than 6 percent during fisheries requiring the release of wild steelhead (Rawding 2000b). Table 9 represents the CRC data since 1990.

Table 9. Recreational fisheries catch data by basin, based on CRCs submitted by recreational anglers (Washington State Sport Catch Reports, WDFW).

Little White Salmon River (Drano Lake)												
Harvest records May-April[1]		89/90	90/91	91/92	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99	99/00
Steelhead	Summer Hatchery	2,305	1,996	3,171	4,837	2,280	2,640	3,684	1,709	4,267	2,911	2,691
	Summer Wild	0	0	0			45	61	54	92	30	46
	Winter Hatchery	18	8	17	9	11	9	12	0	3	20	3
	Winter Wild	0	0	0			3	0	0	0	0	3
	Totals Harvest	**2,323**	**2,004**	**3,188**	**4,846**	**2,291**	**2,697**	**3,757**	**1,763**	**4,362**	**2,961**	**2,743**
Chinook		1,528	837	1,708	3,033	737	716	2,166	1,688	359	443	N/A
White Salmon River												
Harvest records May-April[1]		89/90	90/91	91/92	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99	99/00
Steelhead	Summer Hatchery	2,346	1,063	1,719	3,731	1,335	2,121	2,652	2,454	1,747	1,081	1,102
	Summer Wild	0	4	2			26	33	38	29	18	19
	Winter Hatchery	110	47	25	113	137	81	25	5	3	51	94
	Winter Wild	38	10	2			19	0	0	0	0	0
	Totals Harvest	**2,494**	**1,124**	**1,748**	**3,844**	**1,472**	**2,247**	**2,710**	**2,497**	**1,779**	**1,150**	**1,215**
Chinook		831	1,053	528	801	763	320	697	419	422	160	N/A
Klickitat River												
Harvest records May-April[1]		89/90	90/91	91/92	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99	99/00
Steelhead	Summer Hatchery	833	1,055	764	1,260	1,236	857	864	608	1,062	664	538
	Summer Wild	0	0	4			34	9	14	18	12	28
	Winter Hatchery	0	0	63	0	0	0	0	0	0	0	37
	Winter Wild	0	0	0			0	0	0	0	0	0
	Totals Harvest	**833**	**1,055**	**831**	**1,260**	**1,236**	**891**	**873**	**622**	**1,080**	**676**	**603**
Walla Walla River and Mill Creek Wild steelhead release since 1985.												
Harvest records May-April[1]		89/90*	90/91	91/92	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99	99/00
Steelhead	Summer Hatchery	1,691	1,474	499	884	1,034	402	1,530	1,564	1,925	306	530
	Summer Wild		0	0			26	40	65	25	0	16
	Totals Harvest	**1,691**	**1,474**	**499**	**884**	**1,034**	**428**	**1,570**	**1,629**	**1,950**	**306**	**546**
Touchet River Wild steelhead release since 1985.												
Harvest records May-April[1]		89/90*	90/91*	91/92*	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99	99/00
Steelhead	Summer Hatchery	505	334	386	217	205	299	559	285	509	51	144
	Summer Wild						14	15	4	4	0	6
	Totals Harvest	**505**	**334**	**386**	**217**	**205**	**313**	**574**	**289**	**513**	**51**	**150**

Table 9. Continued.

Yakima River wild steelhead release; hatchery only retention – ><—closed to all steelhead fishing — >												
Harvest records May-April[1]		89/90*	90/91*	91/92*	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99	99/00
Steelhead	Summer Hatchery	73	26	116	65	0	3	0	20	50	12	53
	Summer Wild											
	Totals Harvest	**73**	**26**	**116**	**65**	**0**	**3**	**0**	**20**	**50**	**12**	**53**

Naches River wild steelhead release; hatchery only retention – ><—closed to all steelhead fishing — >												
Harvest records May-April[1]		89/90*	90/91*	91/92*	92/93*	93/94*	94/95	95/96	96/97	97/98	98/99	99/00
Steelhead	Summer Hatchery	46	2	25	14	0	0	4	0	0	0	0
	Summer Wild							3				11
	Totals Harvest	**46**	**2**	**25**	**14**	**0**	**0**	**7**	**0**	**0**	**0**	**11**

* - Data did not distinguish between hatchery and wild fish.

[1] - Total Harvest is based on CRC summaries. The harvest numbers may represent caught and released fish, illegal harvest, misidentification, recording error, or data entry errors.

II. SALMON

Impacts to listed White Salmon River tule fall chinook caused by fisheries discussed in this FMEP will not change significantly from past fisheries impacts. Fisheries discussed in this FMEP have not changed significantly since 1986 when the size restriction and daily retention limit during resident trout fisheries were changed. Also, the run size of tule fall chinook in the White Salmon River has been stable since 1986 (Figure 4).

III. RESIDENT SPECIES FISHERIES

Historically, WDFW managed resident trout fisheries with a six-inch minimum size restriction. Data collected from smolt trapping facilities and a review of Busby et al. (1996) indict that most juvenile steelhead in the MCMA smolt at the age of two and may reach six inches or more before smolting. Many of these juvenile steelhead were probably mistaken for resident trout and retained as part of a daily limit during trout fisheries. The WDFW has since increased the minimum size restriction for trout fisheries to eight inches in all streams and 12 inches in some larger mainstem tributaries, White Salmon and Klickitat rivers. Based on 1997 smolt outmigration in the Wind River basin, 346 of 347 (99.7 percent) wild steelhead smolts handled in Trout Creek, a tributary of Wind River, were less than 8 inches long. In addition, all 736 smolts handled in the mainstem Wind River smolt trap were less than 12 inches long, and 730 of 736 (99.2 percent) of the wild steelhead smolts were less than 8 inches long (WDFW 1999). Increasing the minimum size restriction during trout fisheries reduced the direct harvest of juvenile steelhead in tributary trout fisheries by more than 99 percent, greatly reducing fishery impact to the juvenile age class of wild steelhead.

Impacts to listed salmon and steelhead during warmwater fish fisheries are negligible. This is because of how and what gears are used during warmwater fish fisheries, the habitats fished, and timing differences between fishing effort and the presence of listed salmon and steelhead during these fisheries. Changes to warmwater fish fisheries have occurs from year to year, but these changes are primarily to benefit warmwater fisheries. Impacts to listed salmon and steelhead

caused by warmwater fish fisheries are negligible and a measurable change will not occur during the fisheries discussed in this FMEP.

Impacts to listed salmon and steelhead caused by whitefish fisheries are small. Most impacts occur from anglers illegally targeting steelhead when fisheries for steelhead are closed and open for whitefish. To decrease impacts to listed salmon and steelhead during whitefish fisheries, WDFW regulates the number and size of hooks allowed. These changes are anticipated to decrease impacts from historic levels, and deterring illegally targeting steelhead during whitefish fisheries.

IV. ANTICIPATED TAKES

The estimated takes of listed salmon and steelhead during fisheries discussed in this FMEP are presented in Table 10. These takes are based on historic creel data, CRC reports, and professional judgement and knowledge of the local fisheries and angling tendencies.

Table 10. The anticipated encounters (take) and estimated mortality to fish of listed stocks per fishery in the MCMA (WDFW Regional biologists).

Affected stock	Escapement goal	Fisheries													
		Steelhead		Salmon		Res. Trout[1]		Whitefish		Others		Total AE		Total EM	
		AE [2]	EM [3]	AE	EM	AE	EM	AE	EM	AE	EM	Adults	Juv.	Adults	Juv.
White Salmon River															
Winter steelhead	N/A	70 %	4 %	0	0	17 %	1 %	0	0	0	0	70 %	17 %	4 %	1 %
Summer steelhead	N/A	45 %	4 %	15 %	1 %	< 3 %	< 1 %	0	0	0	0	60 %	< 3 %	6 %	<1 %
Tule fall chinook	200	< 2 %	< 1 %	5 %	5 %[4]	< 1 %	0	0	0	0	0	7 %	0	< 6 %	0
Klickitat River															
Winter steelhead	N/A	17 %	1 %	0	0	17 %	1 %	17 %	1 %	0	0	34 %	17 %	< 2 %	1 %
Summer steelhead	N/A	35 %	< 3 %	25 %	2 %	< 3 %	< 1 %	< 3 %	< 1 %	0	0	< 63 %	< 3 %	6.3 %	< 1 %
Rock Creek															
Summer steelhead	N/A	0	0	0	0	17 %	1 %	0	0	0	0	0	17 %	0	1 %
Walla Walla River															
Summer steelhead	1,600[5]	378	19	No fisheries. 0		10	1	0	0	1	0	449		20	
Touchet River															
Summer Steelhead	600	Touchet River "take" estimates are included in the Walla Walla River estimates.													
Yakima River															
Summer steelhead	3,000	No fisheries. 0		30 adults	1	<5,000 parr (50 adult Equiv.)	255 parr 5 adult	<100 parr(1 adult equiv.) + 10 adults	5 parr 1 adult	<100 parr (1 adult equiv.) + 10 kelts	5 parr 1 adult	50	5,200	5	265 (5 adult equiv.)

1 Anticipated Encounters (AE) during resident trout fisheries are for juvenile steelhead. The estimated smolt to adult survival rate is .03 based on White Salmon and Klickitat rivers (WDW et al. 1990b).

2 Anticipated Encounters are catch-and-release fish. These numbers are based on creel surveys, CRCs, or professional experience and judgement, and represent the number or percentage of fish from a stock anticipated to be incidentally encountered by anglers of a particular fishery.

3 Expected Mortality (EM) is the hooking mortality of incidentally caught fish, based on 5.1 percent (Mongillo 1984) or 10 percent for White Salmon and Klickitat summer steelhead (Rawding 2000b). Expected mortalities are included in Anticipated Encounters in terms of take.

4 This is a direct-harvest fishery, the Anticipated Encounter is the harvest rate.

5 This is an interim number developed by biologists from Oregon and Washington. It is only an estimation until appropriate data are collected to develop a more accurate number. This number includes all Walla Walla tributaries, including the Touchet River.

Table 10, Take discussion:
The WDFW does not monitor steelhead fisheries in the Little White Salmon (Drano Lake), White Salmon, or Klickitat rivers, or in Rock Creek due to resource limitations. Estimates of encounters and mortalities resulting from these fisheries were developed by experienced regional fish biologists using information on fishery timing, run timing, and location of fishing pressure. Mortality estimates for these three systems are based on an assumed 10 percent hooking mortality for summer steelhead and 5.1 percent for winter steelhead (Rawding 2000b; and Mongillo 1984).

Steelhead encounters are negligible in Rock Creek and other small tributaries entering the Columbia River within the MCMA (D. Rawding, WDFW, pers. comm.). Salmon-directed fisheries are not implemented in these tributaries and summer flows are too low for steelhead access (WDF and WDW 1993). Flows within these tributaries are greatly influenced by precipitation. Steelhead destined to spawn in these tributaries must wait for the fall or winter rains before entering these streams. In most years, flows do not increase to levels that provide access for steelhead until after the general trout season is closed. Juvenile steelhead may be encountered during the general fishing season, however, the eight-inch minimum size restriction will prevent direct harvest of most juvenile steelhead.

The WDFW monitors salmon fisheries in the Drano Lake, White Salmon, and Klickitat rivers primarily to recover CWTs. Spring chinook fisheries are monitored more intensely than fall salmon fisheries due to hatchery spring chinook release programs. Very few steelhead are present during the spring chinook fishery and incidental catch is low. Annual catch record data indicate that very few salmon are caught in the Drano Lake, White Salmon, and Klickitat rivers during November through March, when winter steelhead are in the systems. Fall-run salmon fisheries are spot-monitored, primarily to recover CWTs, and surveys are concentrated in the most popular salmon fishing areas. Creel surveys from 1995 to 2000 indicate that tule fall chinook make up 15 percent of the salmon catch in the White Salmon River (K. Harlan, WDFW, pers. comm.). Because fall salmon fisheries are only spot-monitored, catch data are limited. Run timing, fishery timing, and locations of fishing efforts were used to estimate the take of steelhead during salmon and steelhead fisheries.

Salmon fisheries in the Little White Salmon River are limited to Drano Lake, where Upper Columbia River and Snake River salmon and steelhead may seek thermal refuge from the warmer waters of the mainstem Columbia River. Steelhead fisheries are open in Drano Lake and upstream of the barrier dam. Because many of the fish encountered during fisheries in Drano Lake are not marked, the proportion of salmon or steelhead caught that are actually destined to spawn in the Little White Salmon River is not known.

Encounter rates of wild steelhead during steelhead-targeted angling in the Walla Walla River basin are based on the three-year average, 1997/98 to 1999/00, of CRCs and creel survey data (Table 11). Creel survey data from these three years indicate that wild steelhead make up about 28 percent of all steelhead caught during steelhead angling (J. Bumgarner, WDFW, pers. comm.). Harvest estimates for wild steelhead are based on CRCs received from anglers and may represent

misidentification of fish by anglers or recording errors, e.g., incorrect catch location codes or data entry errors.

The WDFW adjusts CRC data to account for bias and error. All harvest reported on CRCs is summed and expanded for those CRCs not returned by anglers. This method will produce an unbiased estimate if there is no non-response bias. However, successful anglers appear more likely than less successful anglers to return their CRCs, creating a positive non-response bias in these estimates (Alexandersdottir et al. 1994).

The WDFW adjusts salmon and steelhead estimates for this bias (Conrad and Alexandersdottir 1993). The bias adjustment for 2000-2001 large freshwater streams (streams with greater than 20 fish reported in CRCs) is 1.2. There is no bias adjustment for small freshwater streams (streams with under 20 fish reported in CRCs). Bias adjustment for the 2000-2001 sport steelhead harvest is 1.02.

Table 11. Creel survey data for steelhead fisheries in the Walla Walla River basin (G. Mendel, WDFW)

River system	Wild (W) SH released	Hatchery (H) SH caught	Total H Kept	Proportion of W to H Kept	CRC harvest SH	Estimated W handled (proportion of CRC)	Hooking mortally (5.1 percent)[1]	percent Wild hook & release mortality based on CRC
Touchet River								
1999-2000	6	15	9	0.67	150	100	5	3.4%
1998-99	15	24	6	2.50	51	128	7	12.8%
1997-98	54	127	83	0.65	513	334	17	3.3%
Walla Walla River								
1999-2000	24	47	36	0.67	533	355	18	3.4%
1998-99	13	34	31	0.42	282	118	6	2.1%
1997-98	36	155	122	0.30	1,882	555	28	1.5%

[1] A 5.1 percent hooking mortally is used because summer steelhead caught in the Walla Walla River basin are caught during cold water conditions, October through March.

The WDFW does not implement steelhead-directed fisheries in the Yakima River. Steelhead encounters during fall chinook and coho fisheries in the Yakima River basin were estimated using creel survey expansions. A stratified sampling protocol was utilized, interviewing anglers on weekdays and weekends. Sampling effort was split between the upper and lower portion of the 47-mile reach of river open to salmon fishing. The upper Yakima River coho fishery was not systematically surveyed; only spot checks were used. Creel surveys were estimated to sample 15 percent of the total angler effort. Expanding steelhead encounters from creel survey to total angler effort estimated that 20 steelhead were encountered by anglers during the 2000 fall salmon fisheries in the Yakima River basin, and 21 and 13 during the 2001 and 2002 fisheries respectively.

Resident trout fisheries are not monitored in streams and rivers of the MCMA because of funding and staff limitations. Instead, estimates of steelhead encounters during these fisheries are based on professional experience and judgement of local biologists. Based on the timing of resident trout fisheries, virtually all steelhead encounters are expected to be juveniles, pre-smolt (parr). Migrant smolts and adult steelhead are not present in areas of the Yakima River basin where and when trout can be legally harvested (adults are present in the upper basin from November - May; smolts migrate in April and May when the trout fishery is closed to protect salmon and steelhead smolts). Most steelhead encounters during trout fishing occur in the Naches River and its tributaries, which account for 32 percent of the basin's steelhead production. Only 7 percent of the Yakima River steelhead spawn and rear in the upper Yakima River basin upstream of Roza Dam. This spawning distribution information is based on a three-year radio tracking study (Hockersmith et al. 1995).

Research conducted by the YN suggests very few juvenile steelhead are harvested in resident trout fisheries. An analysis of 181 scales from Naches River steelhead juveniles collected at Wapatox trap in the spring of 1988 showed that 17 percent were age 1+ fish, 83 percent were age 2+ fish, and none were age 3+ fish (YN unpubl. data). The mean fork length of the age 1+ fish was only 108 mm, whereas the mean length of age 2+ fish was 167 mm. Although observations of "smolt-like" appearance were not made, most or all of the yearlings were probably dispersing parr, not smolts. The proportion of age 2+ smolts among Naches River system steelhead approaches 100 percent. This interpretation is consistent with a smaller collection of scales collected and analyzed in 1985 that showed all visually-identified smolts were age 2+ fish (YN et al. 1990). These age-length data show that age 2+ smolts are too small (avg. fork length = 167 mm) to be legally harvested in the resident trout fishery in Naches or Yakima river tributaries where the minimum size limit is 8 inches (203 mm).

Most trout fishing effort is observed in the "blue ribbon" section of the upper Yakima River from Roza Dam to Easton Dam. This is a year-round, catch-and-release fishery area. This reach is inhabited predominantly by resident rainbow trout; only 7 percent of the Yakima River steelhead spawn above Roza Dam. Dam counts of upstream-migrating steelhead ranged from 20 - 120 fish annually over the past nine years (1991-92 to 1999-00 runs). The Naches River and tributaries are popular trout fishing areas, but do not sustain the effort the upper Yakima River receives, where commercial guides fish nearly every day of the year. The WDFW does not release resident trout in anadromous portions of the Yakima River basin.

In the Walla Walla River basin, much of the productive natural steelhead spawning and rearing habitats are upstream of concentrated areas of resident trout fishing. Native steelhead production areas in the Touchet River are located in the South, North, Robinson, and Wolf forks. Much of the resident trout fishing takes place downstream in the more accessible areas of the Touchet River mainstem. Washington’s portion of the Walla Walla River mainstem does not contain quality spawning or rearing habitats. Resident trout fisheries are not likely to encounter steelhead, because fisheries are not opened until June 1 and the majority of steelhead smolts have migrated out of the system by mid-May. The release of hatchery resident trout in anadromous waters of the Walla Walla River basin was discontinued in the 2001.

As with the resident trout fishery, warmwater and whitefish fisheries are not often monitored. Salmon and steelhead encounter estimates during these fisheries are primarily based on professional experience and judgement of biologists. However, during a creel survey conducted in the lower Yakima River from April to June of 2002, no steelhead or trout were reported (Hoffarth 2003).

Warmwater fishery occurs primarily in the lower mainstem rivers in the MCMA. These areas are not important salmon and steelhead habitats due to poor water quality (temperature, sediment, etc.). Salmon and steelhead use these areas primarily for migration corridors. Fishing effort in these lower mainstem rivers peaks during spring spawning migrations of warmwater species. Although much of the gear and fishing techniques used to catch warmwater fish are not conducive to catching juvenile salmon or steelhead, some methods may attract them.

Although these warmwater fisheries are open year-round, fishing effort decreases significantly as summer progresses into fall and water temperature drops. By September, when adult steelhead begin to enter the rivers, warmwater fishing effort is very low.

There is very little participation in the whitefish fisheries in either the Yakima and Walla Walla River basins (G. Mendel and J. Easterbrooks, WDFW, pers. comm.). Due to inclement weather conditions and cold air temperatures, relatively few anglers specialize in winter whitefish fishing. Fishing methods and fishery timing (winter months) are more suited to whitefish than trout and few salmon or steelhead encounters are expected. Participation in the Klickitat River whitefish fishery is also very low, however, encounters with steelhead per angler effort are high (D. Rawding, WDFW, pers. comm.). The Little White Salmon and White Salmon rivers do not have whitefish fisheries in their anadromous zones.

Fishing activities in the MCMA will take listed salmon and steelhead. Table 12 shows anticipated takes of wild While Salmon River tule fall chinook and MCR steelhead that may occur during the fisheries management regime described in this FMEP. These numbers demonstrate that the fisheries management regime will not cause jeopardy to listed salmon and steelhead in the MCMA.

Table 12. Total anticipated takes of wild salmon and steelhead during fisheries management activities in the MCMA.

Stock	Encounters			Incidental mortalities			
	Fisheries (catch and release)	Stock assessments		Fisheries (catch and release)[1]	Wild fish harvest (as recorded on CRC)[2]	Stock assessments	
		Adults	Juveniles			Adults	Juveniles
White Salmon summer steelhead[3]	60%	0	500	7%	15	0	25
White Salmon winter steelhead[3]	70%			5%	6		
Klickitat summer steelhead[3]	63%	0	500	6%	11	0	25
Klickitat winter steelhead[3]	34%			2%	0		
Rock Creek steelhead[3]	17%	0	500	1%	0	0	25
Walla Walla steelhead[4]	449	46	4,000	20	19	1	250
Yakima steelhead[5]	100	69	560	10	1	0	20
White Salmon tule fall chinook[3]	7%	0	500	6%	30	0	25

[1] Catch and release mortality numbers are from Table 10. Catch and release mortality rate is based on encounters during the fisheries and a 5.1 or 10% hooking mortality depending of the time of year of the fisheries.

[2] Wild fish harvest is the number of listed fish recorded by angers on annual CRCs. These fish may reflect fish caught and released, illegal harvest, species misidentification, recording error, or data entry errors.

[3] Data provide by local fisheries biologist in Region 5.

[4] Data provided by local fisheries biologist in Region 1.

[5] Data provided by local fisheries biologist in Region 3.

2.1.4) Description of additional fishery impacts not addressed within this FMEP for the listed ESUs specified in section 1.3. Account for harvest impacts in previous years and the impacts expected in the future.

I. STEELHEAD

A. Ocean fisheries

Steelhead are rarely caught in ocean fisheries; therefore these fisheries are not considered a significant source of mortality to MCR steelhead (NMFS 2000d).

B. Columbia River mainstem non-tribal fisheries

As they migrate to their natal streams, MCR steelhead may be caught in non-tribal mainstem Columbia River recreational and commercial fisheries. The NMFS estimates that between 1 and 2 percent of the summer-run MCR steelhead will be harvested during fall mainstem fisheries (NMFS 2002d). The NMFS (2001) indicates an incidental harvest of <2 percent of the wild MCR steelhead occurs during the winter, spring, and summer non-tribal Columbia River fisheries. Non-tribal commercial fisheries directed at steelhead in the Columbia River were prohibited in 1975, and remain closed. Commercial salmon fisheries are designed to optimize chinook or coho catch and minimize steelhead catch through the use of time and area closures and gear restrictions.

C. Treaty Indian fisheries

The estimated impact of tribal fisheries in the Columbia River basin is 3.6 percent during winter, spring, and summer Columbia River fisheries and 3.9 percent of the returning summer-run MCR steelhead during 2002 fall fisheries (NMFS 2001; and 2002b).

Treaty Indian fisheries also occur in tributary waters. Treaty Indian catch of salmon and steelhead in Drano Lake, White Salmon River, and the Walla Walla River basin are not available. The average annual treaty Indian catch of steelhead in the Klickitat River from 1995 to 1999 was 102 steelhead (YN 2001).

The YN conducts steelhead-directed fisheries in the Yakima River. These fisheries generally occur from mid-April to mid-June. Figure 7 summaries the annual harvest of steelhead by the YN in the Yakima River.

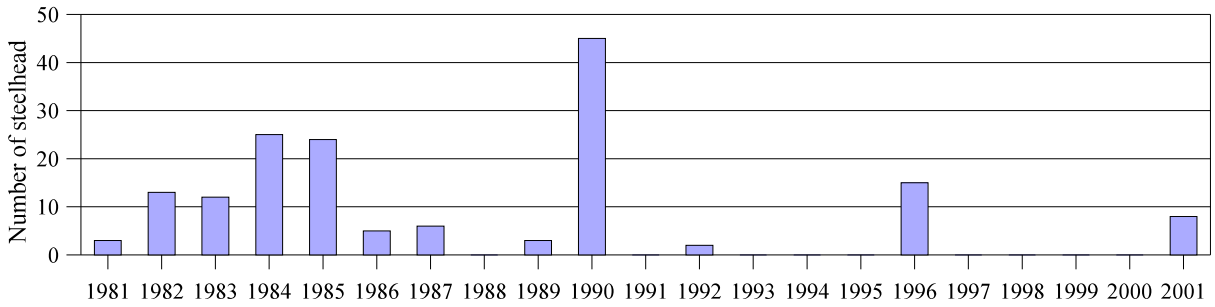

Figure 7. Treaty Indian harvest of steelhead in the Yakima River basin (B. Bosch, YN. pers. comm.).

D. Summary

Impacts to Mid-Columbia River steelhead during various fisheries are summarized in Table 13.

Table 13. Comparison of 2002 impacts to Mid-Columbia River steelhead during various fisheries.

Fisheries Management	Impact
Ocean	No significant impact.
Treaty Columbia River mainstem and Tributaries	7.5 percent
Non-Treaty Columbia River mainstem	≤ 4.0 percent
WDFW Tributaries[1]	0.3 percent

[1] The impact to the Middle Columbia River Steelhead ESU is a rough estimate based on local fisheries biologist's knowledge of the tributaries and their fisheries (Table 10). This estimate is based on WDW et al. (1990b) estimate of the carrying capacity of steelhead in the White Salmon River; estimated steelhead run size in Hood River as a surrogate for Klickitat River runs (Chilcote 2001); estimated hooking mortality in the Walla Walla and Yakima rivers; harvest of wild fish as reported on CRCs; and estimated takes of steelhead during stock assessments.

II. TULE FALL CHINOOK

A. Ocean fisheries

Fall run lower Columbia chinook are heavily impacted by ocean fisheries. The exploitation rate on LCR tule fall chinook is expected to be 35 percent during the 2002 ocean fisheries (NMFS 2002b).

B. Columbia River mainstem non-tribal fisheries

Mainstem Columbia River non-tribal recreational and commercial fisheries in 2002 account for an exploitation rate of 10 percent of tule fall chinook (NMFS 2002b).

C. Treaty Indian fisheries

Tribal fisheries are not expected to have a significant impact on tule fall chinook runs in the MCMA (NMFS 2000d).

The NMFS has developed criteria for an RER (Simmons 2002). The RER for naturally produced LCR tule fall chinook is 49 percent (NMFS 2002b). This includes the impact from all fisheries: ocean, Columbia River, tribal, and recreational tributary. The expected exploitation rates for 2002 fisheries on LCR wild fall chinook as discussed by NMFS (2002b) are illustrated in Figure 8.

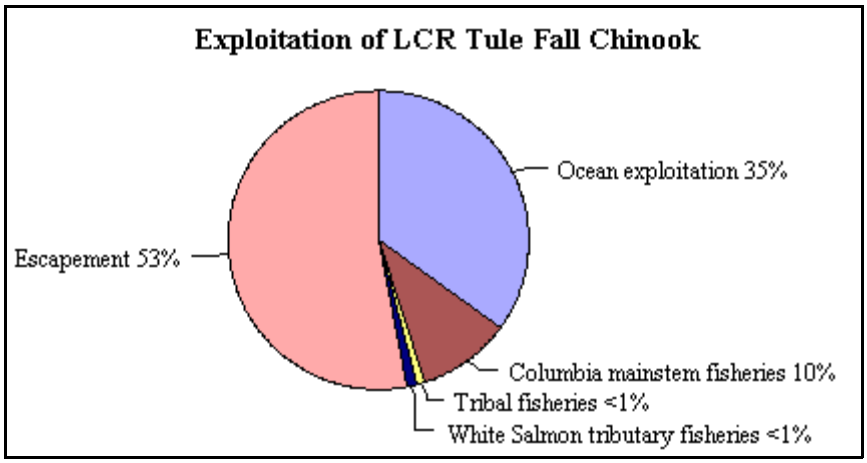

Figure 8. Distribution of the average annual LCR wild tule fall chinook run since 1995 (n = 11,343).

Tule fall chinook are harvested extensively in ocean and Columbia River mainstem fisheries, but are minimally impacted by tributary fisheries. Exploitation of lower Columbia River tule fall chinook during ocean and Columbia River mainstem fisheries has averaged 69.2 percent from 1980 through 1994 and 35.3 percent since 1995 (NMFS 2002b). These fisheries are estimated to exploit 45 percent of the 2002 LCR tule fall chinook run (NMFS 2002b). The White Salmon River tributary fishery accounts for less than 1 percent of the total run size of LCR fall chinook, and less than 4 percent of the White Salmon River tule fall chinook.

SECTION 3. MONITORING AND EVALUATION

3.1) Description of the specific monitoring of the "Performance Indicators" listed in section 1.1.3.

Performance indicators for wild salmon and steelhead in the MCMA include fish population and fishery indicators. Since the objective of this FMEP is to provide fishing opportunity consistent with the recovery of listed species and at rates that do not jeopardize their survival or recovery, primary indicators for this FMEP pertain to abundance and productivity of wild salmon and steelhead stocks. Stock assessments are the primary means by which to evaluate these primary performance indicators. Stock assessments include conducting spawning ground surveys; utilizing dam counting and fish trapping facilities to estimate spawning escapement; conducting electrofishing, snorkel, and hook-and-line surveys; and using a variety of techniques to capture fish for biological sampling and stock evaluation. The collection of tissue samples for DNA analysis and recovery of CWTs will also provide data for stock assessments. Secondary performance indicators involve the evaluation of the different fisheries discussed in this FMEP. To evaluate fisheries, estimates of catch, catch rates, hooking mortality, effort, and catch per unit effort (CPUE) are calculated.

Whenever WDFW develops new stock assessment or fisheries monitoring projects, methodologies, and/or locations, they will be described and reported to NMFS in the annual reporting process discussed in Section 3.5 below.

I. ABUNDANCE AND PRODUCTIVITY

A. SPAWNING GROUND AND REDD SURVEYS

The WDFW conducts spawning surveys in streams to provide direct or index counts of salmonid spawning abundances. Surveys are conducted by walking along or in streams, floating stream sections in boats, or using helicopters or airplanes to fly stream sections counting redds and fish. The WDFW uses this information to determine numbers and species of fish spawning in specific drainages. From these data, management biologists determine spawning distribution and relative abundance, which is incorporated into fish management decisions and actions. The WDFW intends to conduct spawning surveys for salmon and steelhead in all watersheds within the range of the LCR chinook and the MCR steelhead. Spawning surveys may be conducted in all tributaries from the Little White Salmon River upstream to the Yakima River.

Spawning escapement of tule fall chinook salmon in the Little White Salmon and White Salmon rivers are estimated using the Jolly-Seber mark-recapture method and a visibility factor. The visibility factor was developed in the 1980s to account for missed observations associated with poor visibility conditions. This factor has not been used for many years, because water clarity has not restricted visibility.

The WDFW conducts annual spawning surveys for listed steelhead in index streams in the upper Touchet watershed. Index streams, selected for their representation of the basin, are surveyed once a week, from March through May. Index sections are about 2-3 miles in length and located in each of the major Touchet River forks (South, North, Robinson, and Wolf). During each survey, surveyors generally walk along the bank and not in the water when possible. Surveyors look for redds, record and mark their location, and count live and dead fish. At the end of the season, more extensive areas of the river are walked (generally 50-70 percent of the river in total). Results from redd counts and redd life surveys are then used in conjunction with the Touchet River trap counts to estimate the spawning escapement and stock composition of the system (Table 4).

The WDFW is currently expanding spawning survey efforts in the Walla Walla River basin by surveying more tributaries. The WDFW first surveyed Mill Creek 2001 to estimate abundance and distribution of spawning steelhead. The survey was incomplete due to poor water conditions limiting visibility and access problems, however, 22 redds were observed. Annual surveys are planned in Mill Creek. Other streams such as Coppei and Blue creeks may be surveyed in the future as staff and funding allow. The WDFW will continue to conduct spot check spawning surveys and follow-up on anecdotal information to find undiscovered MCR steelhead spawning populations throughout the Walla Walla River basin.

B. ELECTROFISHING SURVEYS

Electrofishing surveys collect juvenile fish for abundance surveys and biological sampling (tissue and scale collection). These surveys are conducted in designated stream sections to provide data for stock assessment (distribution, relative abundance, growth, etc.) and run-size forecasts. Also, WDFW staff conducts presence/absence electrofishing surveys as necessary to determine species presence and distribution. Because it is necessary to maintain proper sampling protocols as well as to minimize impacts to fish encountered, all electrofishing will be conducted according to NMFS' June 2000 and WDFW electrofishing guidelines. Electrofishing surveys may be qualitative (spot checks for presence/absence or to capture fish for directed tissue sampling) or it may be an intensive effort with block nets to provide data for juvenile fish density or population estimation. The WDFW expects to conduct electrofishing surveys in the Walla Walla and Touchet rivers and all their tributaries. Backpack electrofishing surveys may be conducted in the Yakima River and its tributaries from May through November (weather permitting) and parts of the White Salmon and Klickitat rivers, Rock Creek, and other independent Columbia River watersheds when resources are available.

C. SNORKEL SURVEYS

Snorkel surveys are another method to collect data for juvenile salmonid analysis. Snorkel surveys allow biologists to count juvenile salmonids with minimal impact. Surveyors swim sections of streams, counting all fish observed. The WDFW uses snorkel surveys to determine distribution, relative abundance, and growth for a particular brood year. Snorkel

surveys also provide data used to forecast run size. Snorkel surveys are used in the Walla Walla River basin and may occur in other watersheds of the MCMA as opportunities become available.

Snorkel surveys are conducted by WDFW to determine bull trout or steelhead presence in tributary streams. Snorkel surveys are an effective means to monitor salmonid populations with minimal affects to listed fish, and may be conducted in any stream or river in the MCMA. Encounters of steelhead during snorkel surveys will assist with determining the distribution of steelhead in the MCMA.

D. DAM AND FISH TRAP COUNTS

Dam counts made in the Walla Walla River mainstem provide data to estimate escapement to the upper watershed. A ladder and trap system has been installed on the Nursery Bridge Dam enabling the ODFW and CTUIR to count steelhead returning to the upper Walla Walla watershed. Upstream-migrating wild and hatchery fish are counted separately at the dam (Table 4). This facility also allows wild fish to be physically separated from hatchery fish. Hatchery-origin steelhead are prevented from entering upstream of the dam.

The trap on Yellowhawk Creek is installed and operated each year from February 1 through May 31 to collect biological data and assess the status of wild steelhead returning to the Walla Walla River watershed. This monitoring program provides valuable information for use in stock management and recovery planning for steelhead populations in the basin. The trap is continuously monitored when in operation by personnel from the Tri-state Steelheader organization.

The fish trap on the Touchet River is located on a diversion dam that supplies water to a juvenile steelhead acclimation pond. The trap is positioned at approximately RM 53 and is a "V"-type structure that diverts and retains fish in the trap holding box. This trap is currently inefficient, sampling only a portion of the run escaping to the upper watershed, but provides valuable data concerning hatchery/wild run composition. The WDFW uses the data collected at this trap in conjunction with spawning surveys to estimate steelhead spawning escapement and run composition. The WDFW has submitted a funding proposal to upgrade the efficiency of this facility.

Spawning escapement in the Yakima River basin is estimated using YN video camera counts of steelhead passing through Prosser Dam. The YN also conducts redd count surveys in Satus and Toppenish creeks and periodically count steelhead at Roza Dam. Cameras are placed at counting windows in each ladder of Prosser Dam. All fish passing through the dam must travel through one of the three ladders. These video counts generally enumerate 100 percent of the run, although some interpolation is required when turbid water results in poor video images. Rarely, cameras must be removed when the river is at flood stage.

In an effort to monitor salmonid passage up the Klickitat River, the WDFW received funding to install and operate a fish trap on the number 5 fishway at Lyle Falls. The fish trap will be installed early in 2003 and operate for two fiscal years ending in 2005. This trap will provide WDFW with much needed data on escapement of salmon and steelhead into the Klickitat River. These data will provide the beginning of a database WDFW will use for fisheries management.

Since it is possible for fish to jump the falls adjacent to Lyle Falls number 5 fishway, WDFW will estimate populations using a Petersen mark and recapture estimate (Ricker 1975). The WDFW will estimate the number fish jumping the fall (bypassing the trap) through snorkel surveys, a creel survey of tagged and untagged fish, or a re-release of marked adults below the trap to calculate trap efficiency. Because the YN is already conducting salmon carcass surveys, adult salmon will be tagged to determine the ratio of tagged to untagged fish. A secondary mark (opercle punch) will also be applied to allow WDFW to determine tag loss. The WDFW will estimate population sizes using a stratified Petersen or Jolly-Seber estimate and confidence intervals will be calculated using a bootstrapping method.

E. HOOK-AND-LINE SURVEYS

The WDFW conducts hook-and-line surveys to monitor resident fish, bull trout, and steelhead populations in designated index areas. Adults or juvenile fish are caught with hook and line using artificial lures with single barbless hooks or barbless flies for stock assessment or to obtain tissues for DNA analysis or scale sampling. Hook-and-line surveys provide data used to determine age structures of spawning populations, estimate brood year returns, and ascertain stock composition (hatchery/wild). The WDFW will use the following precautions to minimize impacts to listed fish during hook-and-line surveys:

- Samplers will avoid extended durations of "playing" hooked fish, instead retrieving the fish quickly to minimize loss of energy reserves that might be expended during its attempts to evade capture.
- Gullet-hooked fish will be released by cutting the leader, rather than extracting the hook. To the extent feasible, all fish captured will be maintained in the water during sampling and prior to release.
- The duration of time that fish are de-watered as a result of the proposed programs will be minimized to the greatest extent feasible.

Hook-and-line surveys are expected to occur in the Touchet River and its major tributaries, the mainstem Walla Walla River, and lower Mill Creek and possibly Coppei Creek. As resources become available, hook-and-line surveys will be conducted in the White Salmon and Klickitat rivers, the Yakima River upstream of Roza Dam and its tributaries, Rock Creek, and other independent Columbia River watersheds in Washington.

F. GENETIC AND MORPHOMETRIC SAMPLING AND POPULATION STUDIES

The WDFW will collect tissue and scale samples from fish encounters during monitoring programs (trapping facilities, carcass surveys, or creel surveys). Genetic analyses (allozyme or DNA-based sampling) will be conducted on the samples to determine what degree discrete populations persist in individual watersheds. Allozyme analyses will be compared with past collections to monitor changes in allelic characteristics to assess whether supplementation programs reduce genetic diversity of the natural populations.

The WDFW will use beach seining and dip netting as alternative methods to capture fish. Beach seining and dip nets are used in the Walla Walla River basin to collect adult steelhead for biological sampling (tissue or scale) for DNA analysis and for radio telemetry studies. Part of stock assessment activities in the Walla Walla River basin include tagging steelhead with radio transmitters and tracking their movements throughout the basin. Beach seining is also productive in juvenile steelhead abundance and distribution surveys and is used in the Walla Walla River basin.

II. FISHERIES MONITORING

Fisheries performance indicators typically include estimates of catch, catch rate, harvest, harvest rate, hooking mortality for released fish and, effort and CPUE for the fishery. The WDFW makes statistically-based estimates of hatchery-origin salmon and steelhead catch from CRC data. The WDFW monitors indirect mortality to wild salmon and steelhead that may occur from incidentally hooking and releasing fish. Based on literature searches, WDFW estimated the hooking mortality for steelhead and salmon to be approximately 5 to 10 percent depending on water temperature (Bendock and Alexandersdottir 1993; Rawding 2000b; Schroeder et al. 1999).

A. CREEL SURVEYS

The WDFW conducts creel surveys to estimate angler effort and catch rates during fisheries. From these data the WDFW can estimate CPUE, hooking mortality, and harvest. The WDFW uses a variety of techniques when conducting creel surveys, primarily conducting field interviews with anglers along an index river section during a specific time frame. Data collected during creel surveys are expanded to represent effort and catch during an entire fishery. Creel surveys can also serve as periodic spot checks of popular fishing areas. The WDFW may also use phone interviews to follow-up on creel survey interviews.

Interviews with anglers during creel surveys provide the following information: 1) how many steelhead are caught and released, 2) where and when are steelhead caught, 3) what gear types are most likely to catch non-target steelhead while fishing for fall chinook and coho salmon, 4) how long steelhead were played prior to release, 5) condition of steelhead at release.

The WDFW will conduct creel surveys in all basins in the MCMA in accordance with availability of funding and staff. The WDFW currently conducts annual creel surveys in the White Salmon and Klickitat rivers during spring chinook fisheries, Touchet and Walla

Walla rivers during steelhead fisheries, and in the Yakima River during fall chinook and coho fisheries. The WDFW uses spot check creel surveys in the White Salmon and Klickitat rivers during fall chinook fisheries. Information concerning steelhead angling is also collected incidental to creel surveys conducted during salmon fisheries.

Creel surveys are conducted on the Yakima River to monitor harvest rates during spring and fall chinook fisheries. These fisheries are managed by quotas. Creel surveys are used to determine when quotas are reached, and also provide valuable data on incidental steelhead catch, where steelhead are most heavily encountered, and what types of gear are most likely to catch steelhead.

There is a lack of data pertaining to fisheries and fish abundance in the Naches River. During the current fisheries management regime, no creel surveys or fish population estimates have been conducted in the Naches River. Regional WDFW biologists have designed creel surveys and fish population assessments in the Naches River in coordination with an adjustment to fishing regulations from a consumptive resident trout fishery to a catch-and-release resident trout fishery to take effect in 2003. To evaluate the impacts of this fishery change, WDFW will conduct electrofishing surveys using drift boats to assess fish populations in the waters affected by the regulation change and adjacent waters. These surveys will be conducted before changes are implemented and from several years after. Creel surveys will also be conducted in these waters before and after the proposed regulation change is implemented.

B. CATCH RECORD CARDS

Catch record cards are used to collect information concerning angler harvest. Anglers are required to submit CRCs with specific data for all salmon and steelhead retained, including species of fish, date and area of catch, and age status (jack or adult). The current structure of the CRCs does not provide the anglers an opportunity to record data for fish released. Although not required, many anglers record data for all fish caught, regardless if retained. This, along with angler recording errors, species misidentification, misrepresented data, data entry errors, and illegal harvest may account for aberrant records of fish on CRCs in closed areas or of wild fish retention. Table 9 illustrates the 1989-90 to 1999-00 catch record card data for fisheries in the MCMA.

The CRC data are adjusted to account for bias and error. All harvest reported on CRCs are summed and expanded for those CRCs not returned by anglers. This method will produce an unbiased estimate to compensate for non-response bias. However, successful anglers appear more likely than unsuccessful anglers to return their CRCs, creating a non-response bias in these estimates (Alexandersdottir et al. 1994).

Salmon and steelhead estimates are adjusted for this bias (Conrad and Alexandersdottir 1993). The bias adjustment for 2000-2001 large freshwater streams (streams with 20 or more fish reported in CRCs) is 1.2. There is no bias adjustment for small freshwater

streams (streams with less than 20 fish reported in CRCs). The adjustment for bias during the 2000-2001 recreational steelhead harvest is 1.02.

Catch record cards are monitored annually by local biologists. Data from CRCs are compared to previous years data to evaluate catch trends.

C. CODED-WIRE TAG ANALYSIS

A CWT recovery program will be initiated in association with the endemic Touchet River steelhead broodstock hatchery program. During the initial years of the endemic broodstock program, all hatchery steelhead will receive a CWT prior to release, along with an external mark, other than a clipped adipose fin, to distinguish them upon returning as adult.

Coded-wire tags will be retrieved from salmon and steelhead caught or collected incidentally during commercial harvest, at adult trap locations, during creel surveys, and during spawning surveys throughout the MCMA. All externally-marked fish collected at trapping facilities, observed during creel surveys, or recovered during spawning surveys will be checked for CWTs. If a CWT is present, the tag will be collected and analyzed. Coded-wire tags can provide information pertaining to smolt-to-adult return rates, harvest rates and catch locations, size and sex ratios of returning fish, and age of returning fish.

3.2) Description of other monitoring and evaluation not included in the Performance Indicators (section 3.1) which provides additional information useful for fisheries management.

The YN conducts several monitoring activities for steelhead in the Klickitat River. They operate two juvenile screw traps on the mainstem. These traps provide steelhead smolt outmigration data, however, trap efficiency is currently very low. New trapping locations will be tested to improve efficiency. Steelhead spawning surveys are also conducted throughout the basin. Spawning surveys provide information used to estimate spawning escapement and steelhead distributions. The YN is expanding spawning surveys to cover more of the basin. Existing data are insufficient to accurately estimate steelhead abundance.

The YN conducts productivity and distribution surveys in tributaries of the Klickitat River accessible to steelhead. These surveys consist of habitat inventory and electrofishing and snorkel surveys. Randomly-selected 1500-foot sections (transects) of these tributaries are surveyed to record habitat composition. Electrofishing surveys are conducted in 300-foot subsections of the transects to identify fish species composition. The habitat surveys are designed to identify habitat productivity, while electrofishing and snorkel surveys will aid in identifying steelhead distribution in the basin. The YN has conducts these surveys in Dillacort, Wheeler Canyon, Swale, Dead Canyon, Summit, White, Trout, Bear, McCreedy, Piscoe, and Diamond Fork creeks; and Little Klickitat and Klickitat rivers.

Hatchery programs are required to monitor and evaluate performance indicator. These monitoring and evaluation activities are discussed in the various HGMPs prepared by WDFW and submitted to NMFS. Some of these activities include downstream smolt trapping, snorkel surveys, and biological sampling and fecundity studies. See HGMPs for more details concerning monitoring and evaluation activities.

The WDFW may initiate a downstream smolt trapping program in the Touchet River as part of the endemic steelhead hatchery program. The trapping program will trap natural and hatchery-origin steelhead from March through June. These data would enable WDFW staff to estimate natural smolt production from the upper basin and analyze performance of hatchery releases, providing WDFW with an estimate of residualism from hatchery releases. Some of the natural and hatchery fish captured in the trap will be measured and weighed before being released. A subset of captured fish will receive a partial caudal fin clip for identification, and will be released upstream of the trap site about one to two miles. The subsequent recapture of some of these marked fish will help to calculate trap efficiency. Other groups of fish (about 100/group) may be tagged with Passive Integrated Transponder (PIT) tags to determine migration speed and relative survival during downstream migration. During peak outmigration, fish may be held in live boxes for two to three hours before they are released (mark/recapture trial, or PIT tagged). The trap may be checked only once a day during lower intensity migration timing; delayed migration will result for those fish. Delayed mortality is also a possibility resulting from injuries that may occur during trapping and tagging. Mortality of natural steelhead is expected to remain below 0.5 percent, based upon smolt trapping data from the Tucannon River since 1997.

Snorkel surveys, in conjunction with electrofishing surveys, may be conducted during summers in the Walla Walla River basin. Data from these surveys will be used to compare estimated densities and the population of age 0 and age 1+ summer steelhead throughout the Walla Walla River basin to historical records since 1984. The WDFW will also use data collected during snorkel and electrofishing surveys to estimate the number of residual steelhead left in the river after hatchery supplementation releases.

Scale samples, morphometric data, and fecundity data may also be collected from fish handled during hatchery broodstock collection activities. These data will provide information on fish age, sex, size, time of return, and reproductive success of a stock. The endemic steelhead hatchery program in the Touchet River provides the WDFW an opportunity study the fecundity of different age classes of natural spawners. Fecundity of 3, 4, and 5 year-old fish collected for broodstock will be determined. These data will then be used to estimate the reproductive potential for natural spawning populations This information will be used for future management decisions, monitoring stock health, and update stock status.

In addition to routine monitoring and evaluation activities described above, WDFW also collects or uses information from other sources related to the status of listed salmon and steelhead, and the implementation of fisheries which might affect them. Since freshwater habitats are linked to wild steelhead and salmon production, WDFW monitors habitat through the Salmon and Steelhead

Habitat Inventory Assessment Program (SSHIAP), and through checks on hydraulic permits. These data may be useful in forecasting salmon and steelhead runs. Chinook salmon and steelhead are also extensively monitored and evaluated at local hatcheries. These programs inventory production and returns, track straying, monitor fish health, and relate return rates to hatchery practices.

The YN operates a smolt counting facility in the Yakima River. This facility counts and estimates smolt outmigration immediately below Prosser Dam. Smolts enter the upper end of Chandler Channel, a waterway created by and in conjunction with Prosser Dam, and are trapped at the counting facility. Depending on river flows, more than 50 percent of downstream migrating smolts are trapped (J. Easterbrooks, WDFW, pers. comm.). Data collected at the smolt trapping facility are used to estimate steelhead smolt outmigration numbers, smolt-to-adult survival rates, and productivity of the river. A smolt collection facility is also located at Roza Dam. This facility provides similar data for the upper Yakima River mainstem.

Snorkel surveys are conducted throughout the Yakima River basin by YN for several purposes. The YN conducts snorkel surveys near salmon smolt release and acclimation sites to document residualization. Snorkel surveys may also be conducted in association with coho salmon radiotelemetry studies conducted by the YN.

3.3) Public Outreach

The popularity of salmon and steelhead fisheries results in intense public participation in the annual management processes for these species. The WDFW conducts extensive public involvement and outreach activities related to salmon and steelhead fishery management and recovery. The annual fishery regulation process involving a series of public meetings, information mailouts, press releases, and public hearings described in detail in section 1.5. Anglers are keenly aware of, and accustomed to, abrupt inseason management changes including closures and reopenings with short notice. Permanent regulations are detailed in annually-published pamphlets of fishing regulations. Annual regulation and inseason changes are widely publicized through press releases, phone calls or faxes of action notices to key constituent groups, and signs posted at fishery access points. The WDFW also operates an information line, a recorded hotline, and an Internet web page where timely information is available.

3.4) Enforcement

Recreational fishing regulations in Washington are enforced by WDFW's Enforcement Program. The Fish Management and Enforcement programs work together to develop enforceable regulations to achieve fish and wildlife resource management goals. Staff work together to facilitate enforcement of resource management regulations through a cooperative enforcement planning process where local sergeants and officers meet with local biologists at the district level to set enforcement priorities for each fish species. Sergeants then develop plans to address priority issues and to attain desired compliance levels to protect resources and meet management goals.

Compliance is typically estimated based on the percentage of angler contacts where no violations are noted. The plans are adjusted, if necessary, based on compliance assessments to make the best use of limited staff and equipment to achieve the goals.

Fisheries that are assigned high priority for enforcement are intensively monitored. Officers are assigned to work during open fishing days and restricted periods, and with additional checks during closed periods. Officers conduct bank and boat patrols to check and assist anglers. Covert surveillance is also made in locations where reports of violations have been received.

Enforcement staff conducted a statewide angler compliance survey in 1992 and 1993 in waters that were open to fishing under wild steelhead release or catch and release regulations. A total of 4,879 anglers was contacted. The anglers had retained 351 steelhead of which six were wild, providing an estimated compliance rate of 98.3 percent (Hahn 1994).

3.5) Schedule and process for reviewing and modifying fisheries management.

3.5.1) Description of the process and schedule that will be used on a regular basis (e.g., annually) to evaluate the fisheries, and revise management assumptions and targets if necessary.

The effectiveness of this FMEP in meeting its objectives will be evaluated annually. Evaluations will involve monitoring wild and hatchery salmon and steelhead escapement, productivity, distribution, and passage through dams. Recreational fisheries will be monitored through creel surveys, annual harvest reports, and CWT analysis. These activities are discussed in detail in Section 3.1.

Fisheries management will be reviewed annually as discussed in Section 1.5. This review process addresses possible fisheries regulation changes based on conservation needs, housekeeping issues, significant recreational opportunities, Commission requests or rules from other forums, and results of annual recreational fisheries monitoring. Proposed fisheries regulation changes will be evaluated for compliance with this FMEP. As discussed in Section 1.5, NMFS will have the opportunity to review and comment on any proposed fisheries regulation changes.

The WDFW will provide NMFS with results of salmon and steelhead population and fisheries monitoring that WDFW collects. These data will include annual escapement estimates and run size for listed and hatchery populations of salmon and steelhead; salmon and steelhead harvest rates and fisheries impacts to listed populations; a summary of any fisheries regulation changes adopted each year; and a description and report of new stock assessment projects, techniques, and/or locations of such projects. This information will be provided to NMFS by July 1 of each year.

Critical and viable thresholds for each population have not yet been established. However, the TRT has developed interim abundance targets. The WDFW will work with TRTs to develop

estimates of critical and viable thresholds and incorporate these thresholds into this FMEP as they are developed. The NMFS has developed interim abundance targets for geographical spawning aggregations within ESUs. These interim abundance targets will provide a preliminary and general sense of the ESA recovery objectives currently under development by the TRT. However, these are not critical or viable thresholds.

3.5.2) Description of the process and schedule that will occur every 5 years to evaluate whether the FMEP is accomplishing the stated objectives. The conditions under which revisions to the FMEP will be made and how the revisions will likely be accomplished should be included.

This FMEP is intended to remain in effect indefinitely. The WDFW will annually monitor wild and hatchery salmon and steelhead populations and recreational fisheries performance and impacts for compliance with the objectives of this FMEP.

In addition to the annual evaluation, WDFW will conduct a comprehensive review of this FMEP in 2007 to evaluate whether fisheries and wild salmon and steelhead populations covered in this FMEP are performing as expected. Comprehensive reviews will be conducted by WDFW every five years thereafter until wild stocks are recovered and delisted.

The comprehensive review process will provide WDFW with a broad view of the effectiveness of fisheries management in meeting this FMEP's objectives. If it is determined that fisheries management is not meeting the objectives of this FMEP, WDFW will make the appropriate revisions. It is not known if or what revisions will be made. Revisions will be made on a case by case basis. These comprehensive reviews will also incorporate any new information which may require revisions in assumptions or management strategies. The WDFW will consult with NMFS to determine if the revisions are the best and most appropriate management action to take in addressing the plans deficiencies.

SECTION 4. CONSISTENCY OF FMEP WITH PLANS AND CONDITIONS SET WITHIN ANY FEDERAL COURT PROCEEDINGS

A Federal court decision in 1969 (*U.S. vs. Oregon*) ruled that Columbia River Treaty Tribes who signed treaties with the federal government in the 1850s are entitled to half of all harvestable salmon and steelhead destined for the tribes' traditional fishing grounds. This court decision mandated fisheries management cooperatively in a government-to-government relationship between the states of Oregon and Washington and the treaty Indian tribes. This decision includes fisheries management in the Snake River basin.

As a result of *U.S. vs. Oregon*, the Columbia River Fish Management Plan (CRFMP) was development to facilitate fisheries management in the Columbia River basin. The TAC is a product of the CRFMP and is represented by all parties of *U.S. vs. Oregon*. The TAC is responsible for technical recommendations regarding harvest management and impacts for fisheries in the Columbia River basin. In 1999, the CRFMP expired, however the TAC still provides the technical recommendations for harvest management. An Interim Management Agreement was developed in 2001 to take place of the expired CRFMP. The Interim Management Agreement, as advised by the TAC, provides harvest allocation guidelines spring/summer chinook for the parties the *U.S. vs. Oregon*. The WDFW manages its spring/summer recreational fisheries in the Snake River basin within the allocation set forth in the Interim Management Agreement.

All WDFW-regulated anadromous fisheries in the MCMA are conducted in cooperation with the parties of U.S. vs. Oregon.

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